CH2M HILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA
95833-2937
Tel 916.920.0300
Fax 916.920.8463

CH2MHILL

July 9, 2001

Ms. Cheri Davis
California Energy Commission
Energy Facilities Siting and Environmental Protection Division
1516 Ninth Street, MS-15
Sacramento, CA 95814

Subject: East Altamont Energy Center Application for Certification
Data Request Response Set #1 (01-AFC-04)

Dear Ms. Davis:

Enclosed are 12 copies and 1 original of the East Altamont Energy Center Application for Certification Data Request Response Set #1. Contrary to the written requirements of Data Request Nos. 1, 2, 3, and 4, 5 sets of the requested visual simulations were not included in the response set. Instead, per your email directions, copies of the visual simulations were included with each copy of this docketed data request response. Also enclosed are 3 compact diskettes as requested in Data Request No. 5.

If you have any questions, please call me at 916-920-0300.

Sincerely,

CH2M HILL

Jerry Salamy
Project Manager

Enclosure

c: Alicia Torre/Calpine
Steve DeYoung/Calpine
Jim McLucas/Calpine
Susan Strachan/Calpine
Gregg Wheatland/Ellison, Schnieder & Harris
Gary Rubenstein/Sierra Research
Michael Clayton/Michael Clayton & Associates
Will Walters/Aspen Environmental
Negar Vahidi/Aspen Environmental

East Altamont Energy Center

Data Requests and Responses (01-AFC-4)
Set #1

(Responses to Data Requests: 1 through 9)

Submitted to:

CALIFORNIA ENERGY COMMISSION

Submitted by:

East Altamont Energy Center, Limited Liability Company

July 9, 2001

EAST ALTAMONT ENERGY CENTER
DATA REQUEST AND RESPONSE SET #1 (01-AFC-4)

Technical Area: Visual Resources
CEC Authors: Gary Walker/Michael Clayton/Will Walters
EAEC Authors: Thomas Priestley/Gary Rubenstein

BACKGROUND

The visual simulations in the AFC were not sufficient for full disclosure of the project's potential visual impacts and for staff's analysis of the project. The simulations did not show the project at the start of operation, before the growth of landscaping. In addition, the simulations were not at a life-size scale from a normal reading distance. Also, the simulations did not depict the appearance of the project either with visible vapor plumes or with night lighting.

DATA REQUESTS

1. Please provide five sets of high-resolution color photocopies, at life-size scale when viewed from a distance of 18 inches, of a photograph of the existing view toward the proposed project from each of Key Observation Points (KOPs) 1 through 6. The photograph from KOP 5 should be taken under sunny morning conditions required for the depiction of reasonable worst case vapor plumes, as discussed below.

   Response: East Altamont Energy Center, Limited Liability Company (EAEC, LLC.) submits the attached set of high-resolution, 11 by 17 inch color photocopies of a photograph of the existing view toward the proposed project from each of Key Observation Points (KOPs) 1 through 6. EAEC, LLC. objected to preparing a new photograph from KOP 5 in its June 29, 2001 letter.

2. Using the photographs requested in Data Request 1 as a base, please provide five sets of high-quality color photocopies, at life-size scale when viewed from a distance of 18 inches, of the following visual simulations.

   a. The proposed project at the start of operation from each of KOPs 1 through 6;

      Response: One set of high resolution color photocopies at 11 x 17 size of simulations that represent views toward the project from Key Observation Points 1 through 5 at the time of the project startup are attached per the CEC project manager's direction.

   b. The proposed project with proposed landscaping five years after the start of operation from each of KOPs 1 through 5;

      Response: EAEC, LLC. objected to this data request in its June 29, 2001 letter.

c. The proposed project with proposed landscaping at maturity from each of KOPs 1 through 5; and

Response: A set of high quality photocopies of the simulations of the project as it would appear at 20 years after start of operation from KOPs 1 through 5 are attached.

d. The proposed project at the start of operation with a visible cooling tower plume of dimensions predicted by the SACTI model for 10% of daylight no-fog hours from KOP 5. The simulations must encompass enough of the view to include all of the visible plume.

Response: EAEC, LLC. objected to this data request in its June 29, 2001 letter.

3. Please provide five sets of high-resolution color photocopies, at life-size scale when viewed from a distance of 18 inches, of a photograph of the existing view toward the proposed power plant site from KOP 5 at night.

Response: Attached is a sets of high-resolution color photocopies, at 11 x 17, of a photograph of the existing view toward the proposed power plant site from KOP 5 at night.

As a further response to this data request, we are also submitting the following documentation of the night lighting conditions that now exist in the vicinity of the project site.

Night Lighting Conditions in the Vicinity of the East Altamont Energy Center Site

As pointed out in Section 8.11.1.1 of the AFC submitted for this project, the EAEC site is located in an area of large-scale agriculture in which an unusually large number of major infrastructure facilities have been sited, creating a landscape that is a mix of the rural and technological. For both operational and security reasons, many of these infrastructure facilities are brightly illuminated at nighttime. This lighting is a visually prominent element of the project's nighttime landscape setting. To document the lighting conditions at these facilities and the effects of this lighting on views from each of the Key Observation Points, we present this summary of the area's night lighting conditions.

This summary is illustrated with a set of color photographs taken in the project area on the night of June 16, 2001. The photographs were taken by a skilled landscape photographer who used a 35-mm camera with a tripod and a 50-mm lens. The film used had a speed of ASA 200, and a range of shutter speeds was used to take a series of photos of each view. After the photos were printed, the photo sets for each view were carefully reviewed, and the photo with the exposure that was judged to best represent the actual in-field lighting conditions was

selected for use in this report. Figure Vis 3-1 is a map indicating the locations from which each of the photos were taken.

The Western Area Power Administration's Tracy Substation is located across Mountain House Road, immediately to the southeast of the EEAC site, The equipment in this large facility is brightly lit at nighttime. Figure Vis 3-2 is a night view of the 500 kV switchyard as seen from the east. Because there is no landscaping or solid fencing around this portion of the substation, the brightly illuminated equipment is fully visible, and light from the substation extends into the surrounding landscape. Figure Vis 3-3 is a view of the 230 kV substation, seen from Kelso Road. Although the tree hedge along Kelso Road reduces the visibility of the highly illuminated equipment from the surrounding area to some extent, there are places like the one visible in the photo where there is no landscaping, and the brightly lit equipment is readily visible.

Figure Vis 3-4 is a view of the Central Valley Project's Tracy O&M Complex, which is located adjacent to Tracy Pumping Plant. This complex is located approximately 0.6 miles southeast of the EAEC project site. The complex's parking lot lights and illuminated building facades are visible from Kelso Road and from the cluster of rural residences that lie across the street from it.

Figure Vis 3-5 is a view from Kelso Road looking west toward the PG&E gas compressor station. This compressor station lies approximately 1.3 miles to the southeast of the project site. As this photo indicates, the structures and yard are brightly lit, and cast ambient light into the surrounding area.

Figure Vis 3-6 is a view of the Department of Water Resources' Banks Pumping Plant, which is located at the base of the hills 2.4 miles to the west of the project site. As this photo suggests, the substation and buildings at the pumping plant complex are brightly lit, and cast a glow into the sky.

Figure Vis 3-7 is a view of the Department of Water Resources' Skinner fish screening facility located at the California Aqueduct's intake at Clifton Court Forebay. This facility is located 1.3 miles north of the project site and is highly visible from the nearby Byron Highway. As the photo indicates, the structures and outdoor areas at the Skinner Facility are brightly lit, and the lighting casts a glow that extends into the surrounding area.

Night lighting in the project area is not restricted to the major infrastructure facilities. Frequent use of outdoor security lights is made at individual farm and residential properties as well. In addition, Mountain House School, which is located on Mountain House Road approximately 0.8 mile south of the project site is brightly lit at night by a porch light and a pole-mounted security light (Figure Vis 3-8).

At present, a major construction project is taking place at Bethany Reservoir, which is located in the lower hills, approximately 2 miles southeast of the project site. Because the construction is taking place at night as well as during the day, a

set of extremely bright temporary floodlights has been installed (Figure Vis 3-9). These floodlights cast a pronounced glow into the sky, and can be seen for miles around.

Figure Vis 3-10 is the nighttime view from KOP 1. The brightly illuminated 500 kV switchyard at the Tracy Substation, which is located across Mountain House Road and to the immediate southeast of the project site is visible in the right half of the photo. Figure Vis 3-11 is the view from KOP 2. The Tracy Substation's 500 kV yard is visible at the left edge of the view, on the west side of Mountain House Road. As the photo indicates, the substation casts a glow that illuminates the transmission lines along the eastern edge of the road, and even illuminates a portion of the surface of the project site.

Figure Vis 3-12 is the view from KOP 3, the viewpoint located on Mountain House Road directly in front of Mountain House School. In this photo, stray light from the security lighting at the school (see Figure Vis 3-8) illuminates the roadway in the immediate foreground of the view. Light from the Tracy Substation is visible in the distance in the middle of Mountain House Road. The glow from the substation is so bright that it illuminates the steel pole transmission tower located on Kelso Road just to the east of Mountain House Road.

Figure Vis 3-13 is the view from KOP 4, the viewpoint located in front of a residence on Kelso Road at a point half way between Mountain House and Byron-Bethany Roads. In this view, the brightly illuminated equipment at the Tracy Substation is readily visible, as is the glow that the substation casts into the sky. The cluster of bright lights in the distance at the right side of the view may be from DWR's Skinner Facility.

Figure Vis 3-14 is the view from KOP 5, the viewpoint located at Lindeman Road's intersection with Byron Bethany Road. The brightly lit equipment at the Tracy Substation is highly visible in the center of the view. The bright construction floodlighting at Bethany Reservoir is visible in the distance on the view's left edge. The lighting from the substation and reservoir construction site combine to create a large area of glowing sky.

Figure Vis 3-15 is the view from KOP 6, the viewpoint established on Kelso Road 0.45 mile east of Mountain House Road to document the changes associated with the project's transmission line. At night, this view is dominated by the brightly lit equipment at the Tracy Substation, and by the glow it casts into the sky above.

As the photos presented here document, the presence of large, brightly lit facilities adjacent to and in the general vicinity of the EAEC project site has a pronounced effect on the project area's nighttime visual conditions. It is fair to say that in most views toward the project site from the surrounding area, brightly lit infrastructure facilities tend to dominate the view, and that stray light from these facilities casts a glow that partially illuminates the surrounding landscape and whites out portions of the nighttime sky. Given the presence of so much existing

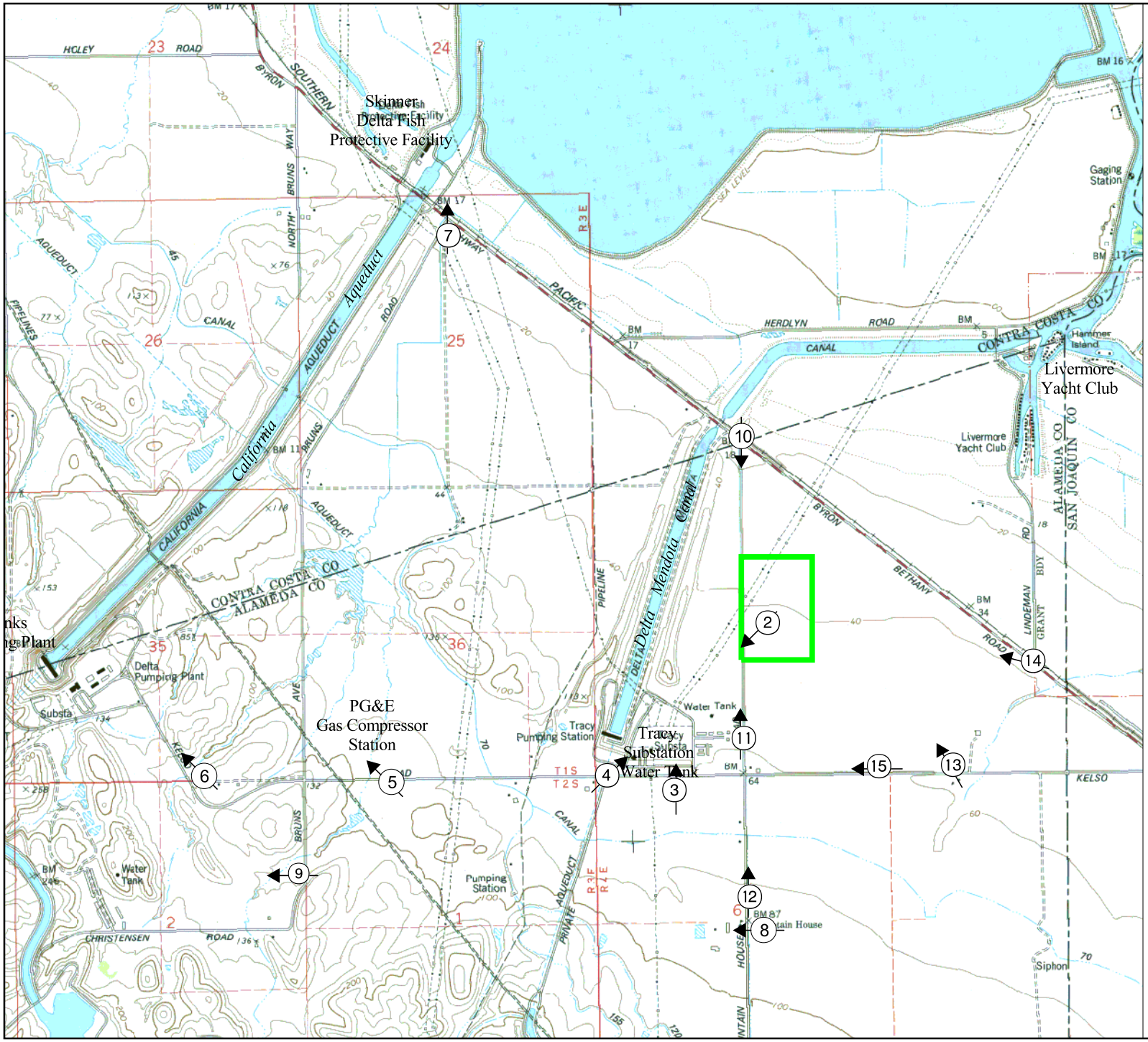
bright illumination in the area, we conclude that the area's sensitivity to the visual changes that would be brought about by the additional night lighting associated with the EAEC project would be low.

4. Using the photograph requested in Data Request 3 as a base, please provide five sets of high-resolution color photocopies, at life-size scale when viewed from a distance of 18 inches, of a photograph of the proposed power plant from KOP 5 at the start of operation with night lighting.

   Response: EAEC LLC objected to this data request in its June 29, 2001 filing. As a substitute for the simulation requested, it indicated that instead, photos will be submitted of the actual nighttime appearance of the Sutter and Los Medanos Energy Centers, two recently built plants whose design reflects current CEC Conditions of Certification regarding lighting. The photos of the nighttime appearance of these facilities will be provided as soon as the lighting installations at these projects are complete and the CEC has conducted its lighting inspections.

5. Please provide 3 CDs containing electronic versions of the photos and simulations.

   Response: Attached are 3 compact diskettes containing the photographs and visual simulations for those data requests to which EAEC, LLC. did not object.



Map Location

LEGEND

PROJECT SITE

PHOTO VIEWPOINTS

THE NUMBERS REPRESENT THE FINAL DIGITS OF THE FIGURE NUMBERS

N

1000 0 1000 Feet

SCALE IS APPROXIMATE

FIGURE VIS 3-1
LOCATION OF THE PHOTOS DOCUMENTING NIGHTIME VISUAL CONDITIONS

RESPONSE TO DATA REQUESTS FOR EAST ALTAMONT ENERGY CENTER

CH2MHILL

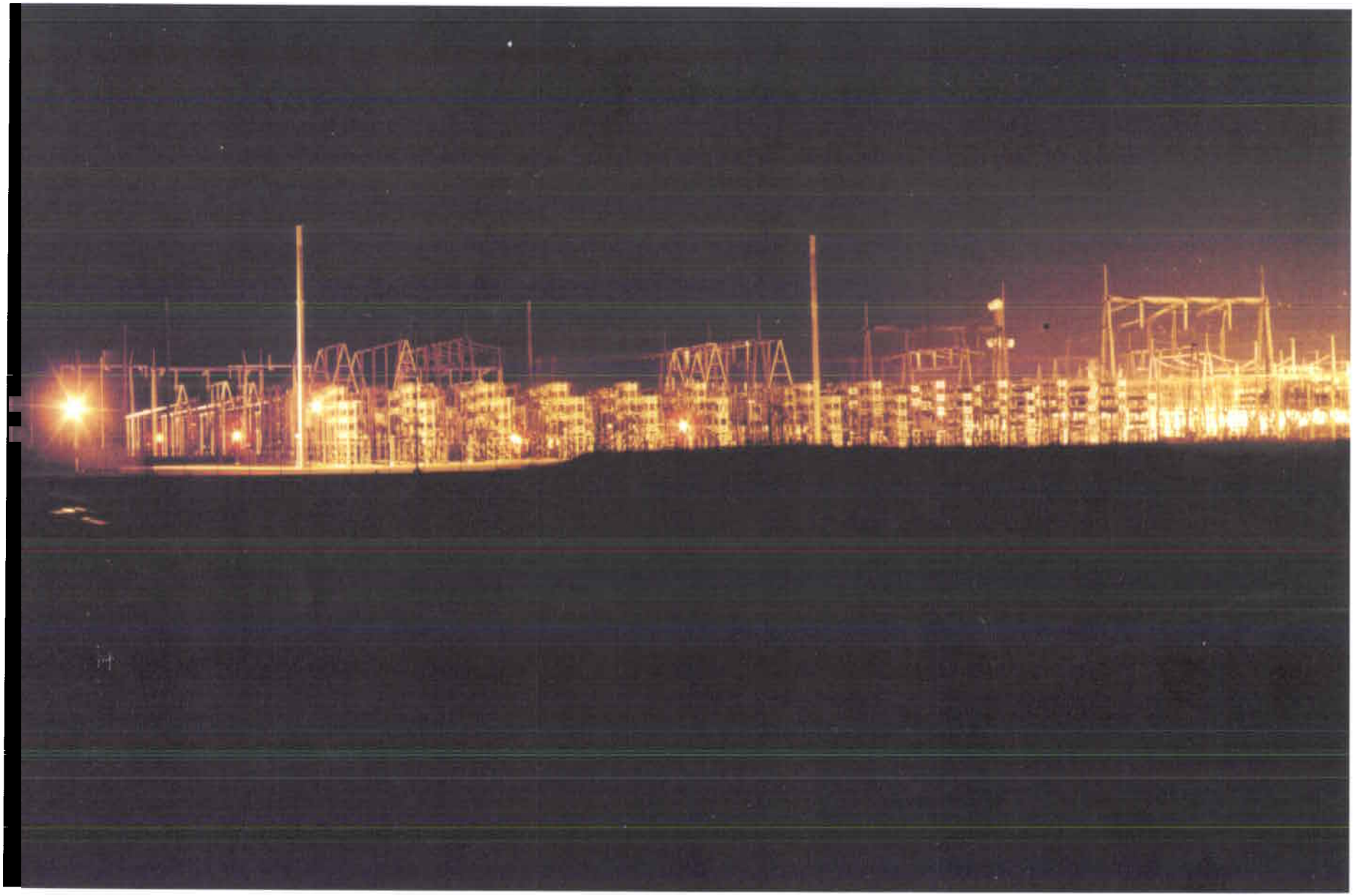


Figure Vis 3-2
Tracy Substation viewed from the east.

Figure Vis 3-3
Tracy Substation viewed from Kelso Road.

Figure Vis 3-4
Tracy O&M complex viewed from Kelso Road.

Figure Vis 3-5
PG&E Gas Compressor Station viewed from Kelso Road.

Figure Vis 3-6
DWR Banks Pumping Plant

Figure Vis 3-7
DWR Skinner Fish Facility

Figure Vis 3-8
Mountain House School.

Figure Vis 3-9
Construction Site at Bethany Reservoir

Figure Vis 3-10
View from KOP 1. The Tracy Substation is the illuminated facility visible on the right.

Figure Vis 3-11
View from KOP 2. Tracy Substation is visible on the left.

Figure Vis 3-12
View from KOP 3. The light aura from the Tracy Substation is visible at the far left. The road segment in the foreground is illuminated by security lights at Mountain house School.

Figure Vis 3-13
View from KOP 4. Tracy Substation is visible in the middleground.
The Skinner Fish Facility is visibble in the distance to the left.

Figure Vis 3-14
View from KOP 5. The Tracy Substation is the illuminated facility visible in the middleground.

Figure Vis 3-15
View from KOP 6. Tracy Substation is the illuminated facility in the far foreground.

BACKGROUND

The AFC (p.8.11-21) discusses visible vapor plumes from the proposed cooling tower. However, the AFC does not provide quantified calculations of the size, duration and frequency of the plumes.

DATA REQUEST

6. Using at least 5 years of meteorological data if available, please provide the following information regarding the project's cooling tower visible vapor plumes, using the SACTI model. If a model other than the SACTI model is proposed for use, please provide a copy and description of that model for staff review and approval prior to conducting the modeling analysis.

   Response: Overview - The responses to data requests related to the potential for formation of visible water vapor plumes from the new combined cycle units and cooling towers were prepared using a visible water droplet plume modeling system developed by Sierra Research. The basic principle involves modeling the dilution of a water vapor plume as a function of wind speed, distance, and stability class from the release point, similar to the Gaussian approach for modeling gaseous pollutants. As the plume is diluted, the temperature of the plume approaches ambient temperature, and the moisture content of the plume approaches the moisture content of the surrounding ambient air. At any given point along the plume, one can use the dilution factors to determine the plume temperature and moisture content, given knowledge of the temperature and moisture content of the plume at the time it leaves the release point, and of the temperature and moisture content of the ambient air. Knowing the temperature and moisture content of the plume at that point enables one to determine whether the moisture will condense at that point to form a visible water plume. By performing these calculations along a series of points, one can determine whether a visible plume will form and, if so, the length and diameter of the visible plume for each hour evaluated.

   The modeling system includes the following components:

   - A modified version of the Industrial Source Complex Short Term Model Version 3 (ISCST3 98356) is used to determine plume dilution through the evaluation of water droplet concentrations determined along a series of receptors placed along the plume centerline. These calculations are performed for each hour of the year using a standard modeling meteorological data set.
   - A second module, CLAUSIUS, determines the amount of dilution of the plume that is required for the visible plume to evaporate.
   - A third module, DISTANCE, determines the distance (along the plume centerline) that the plume is visible.

- A fourth module, COUNT, summarizes the statistics and prints a report.

Each of these components is discussed in more detail below.

Modified ISCST3 - ISCST3 was modified to provide for the determination of pollutant concentrations along the centerline of a plume. The centerline of the plume is represented by flagpole receptors along a single radial from the stack. The model produces an output file, which includes concentrations for each receptor along the radial for each hour of the year. Relative to the concentration present in the stack, the concentrations reported at each receptor represent the degree of dilution of the plume with ambient air at that point. The modified version of ISCST3 has the following features:

- Calculations can be performed for up to 100 receptors placed along the centerline of the plume.
- Default ISCST3 features that prevent calculations of pollutant concentrations at locations close to the emission source have been disabled.
- So as to avoid ignoring meteorological conditions where visible plumes are likely to be formed, wind speeds of less than 1.0 m/s are set to a wind speed of 1.0 m/s, to avoid implementing the calms processing feature of ISCST3.
- Concentrations are calculated regardless of whether the plume height lies above or below the mixing height.
- Calculations are performed for simple terrain only.
- Calculations are performed only for a single source.

CLAUSIUS - The CLAUSIUS module uses a linear interpolation of water vapor pressure, between the stack exit and ambient conditions, together with the Goff-Gratch formulation of the Clausius-Clapeyron equation for water vapor, to determine the amount of dilution required for the visible plume to not be visible. These calculations are performed for each hour of the year, using the same meteorological data set used for the ISCST3 dispersion modeling analysis. The CLAUSIUS program can perform calculations for various types of sources:

- Sources with a fixed exit temperature
- Sources with exit temperatures at a constant increment above ambient temperatures
- Sources with a fixed moisture content
- Sources where moisture content is a function of ambient temperature
- Sources with a moisture content fixed at a specified relative humidity, given an ambient temperature
- Sources which have a diurnal variation in stack parameters.

In this regard, the modeling system can be somewhat more versatile than other models typically used to evaluate visible water plumes, such as SACTIP (Seasonal/Annual Cooling Tower Impact Program), since combustion sources as well as cooling towers can be treated.

DISTANCE - The DISTANCE module uses the resulting output from ISCST3 and CLAUSIUS to determine the distance along the centerline of the plume where sufficient dilution has occurred such that the plume is no longer visible.

COUNT - The COUNT module summarizes and prints the statistics regarding plume visibility. Available statistical outputs include the number and frequency of hours in which a plume is visible (separately for daytime and nighttime conditions), as well as a frequency distribution of visible plume lengths. The day/night boundary is treated as sunrise/sunset, calculated for every day of the year.

Interpretation of Results - The water droplet plume visibility analysis is an approximation technique, which should not be used to establish limiting conditions for the operation of a facility or a particular piece of equipment. The following caveats should be observed in interpreting the model results:

- The model is least reliable at predicting plume visibility under calm nighttime conditions, since both temperature and relative humidity vary strongly with height under those conditions. What is measured at the meteorological station (at a height of 10 meters) may vary considerably from actual conditions at plume height. In general, under cold, nighttime conditions (with shallow radiation inversions), temperatures are likely to be colder and relative humidity higher at the height of the meteorological monitor than at plume height, thus resulting in an overstatement of plume visibility during these conditions.
- Latent heat release and absorption are not treated in the modeling system. These effects are likely to be of secondary importance for combustion plumes traveling for relatively short distances, but may play a more important role for cooling tower plumes. Condensation of water droplets in the plume will cause the plume to increase in temperature, while evaporation of those droplets will subsequently cool the plume by a similar amount. These effects are likely to be negligible in the case of combustion sources, where the plume temperature is already 100°F (or more) warmer than the surrounding ambient air, but could be more significant for cooling tower plumes. The effect of ignoring latent heat release and absorption is to slightly underestimate initial plume rise, and slightly underestimate plume length.
- The model results are extremely sensitive to assumptions regarding ambient and stack gas moisture content and relative humidity (as is

actual plume visibility). Furthermore, it is not clear that the accuracy of the ambient relative humidity monitors is suitable for the use to which the data are being applied.

- The modeling system does not have the capacity for distinguishing foggy hours from other hours. Since the identification of foggy hours is frequently absent from the meteorological databases commonly used for modeling, the capacity to identify foggy hours has not been incorporated into the modeling system.

Meteorological data used for this analysis were taken from the Tracy station, and are for calendar years 1997-1999. Relative humidity data are not collected at that station; these values were obtained from the CIMIS station located in Brentwood for the same time period.

A copy of the model source code, meteorological data, and input and output files are being provided to the Commission under separate cover.

a. The total number of daylight hours annually and seasonally;

Response: Table VIS-6.1 shows the number of hours per year that there is the potential for formation of a visible water vapor plume of various lengths from each cooling tower cell. The analysis assumes that each cooling tower cell is operated for 8,760 hours per year. The analysis was performed for each of the three years of meteorological data available.

Table VIS-6.1
Potential for Formation of a Visible Water Vapor Plume from Cooling Tower Cells (hours per year)

Plume Length (meters)	1997 Met Data			1998 Met Data			1999 Met Data		
	Total	Day	Night	Total	Day	Night	Total	Day	Night
All	556	165	391	752	216	536	737	206	531
Days with 1 hour or more of a visible water vapor plume									
All	73	54	69	112	87	100	115	99	104

A seasonal distribution of these hours is presented in the plume roses included as Figures VIS-6.1a through VIS-6.1l.

b. The total number of daylight no-fog hours annually and seasonally;

Response: See response to Data Request 6.a

c. The length, height, and width of plumes predicted to occur 10% of all daylight hours and all daylight no-fog hours annually and seasonally;

Figure 6.1a

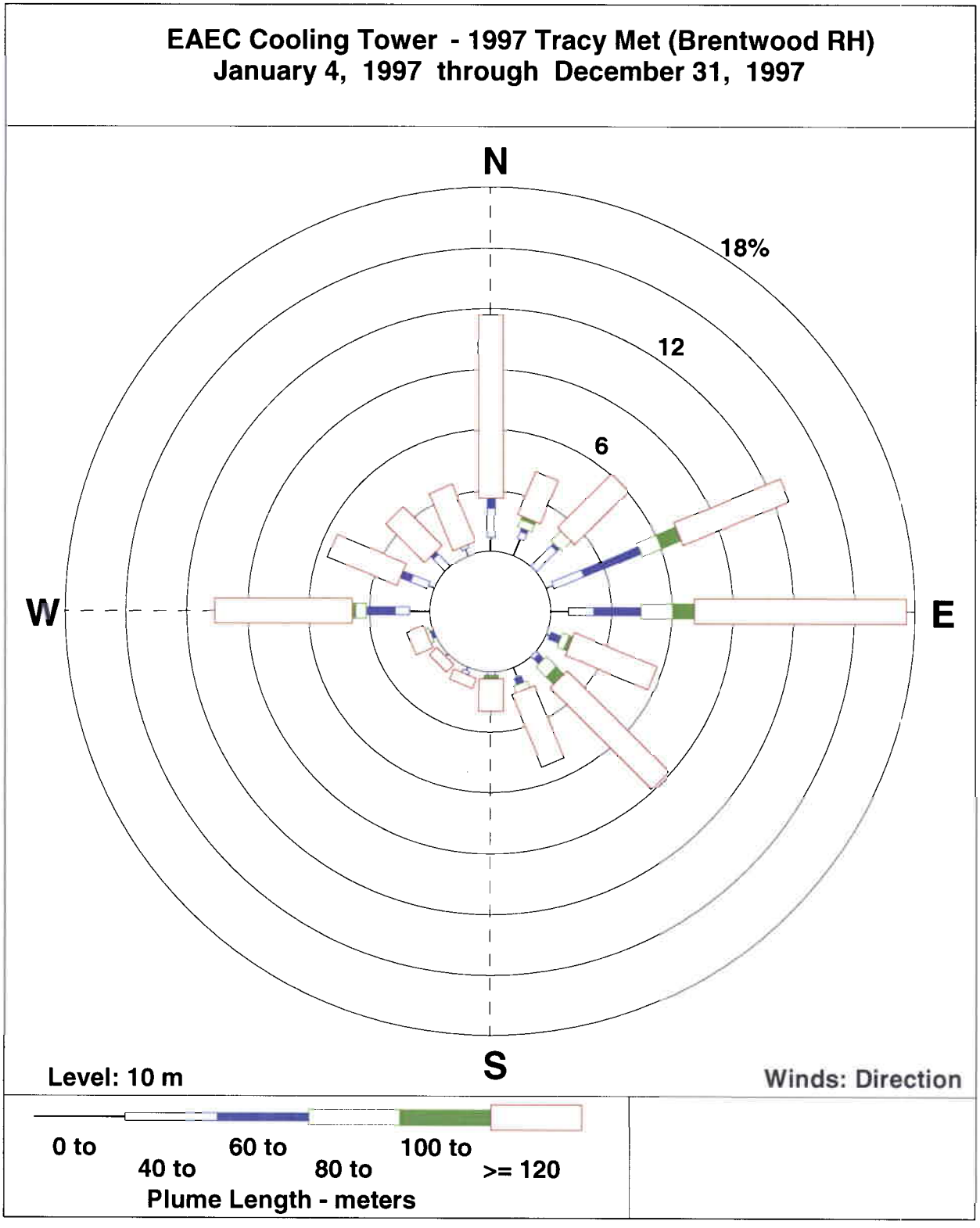

EAEC Cooling Tower - 1997 Tracy Met (Brentwood RH)
January 4, 1997 through December 31, 1997
N
18%
12
6
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.1b

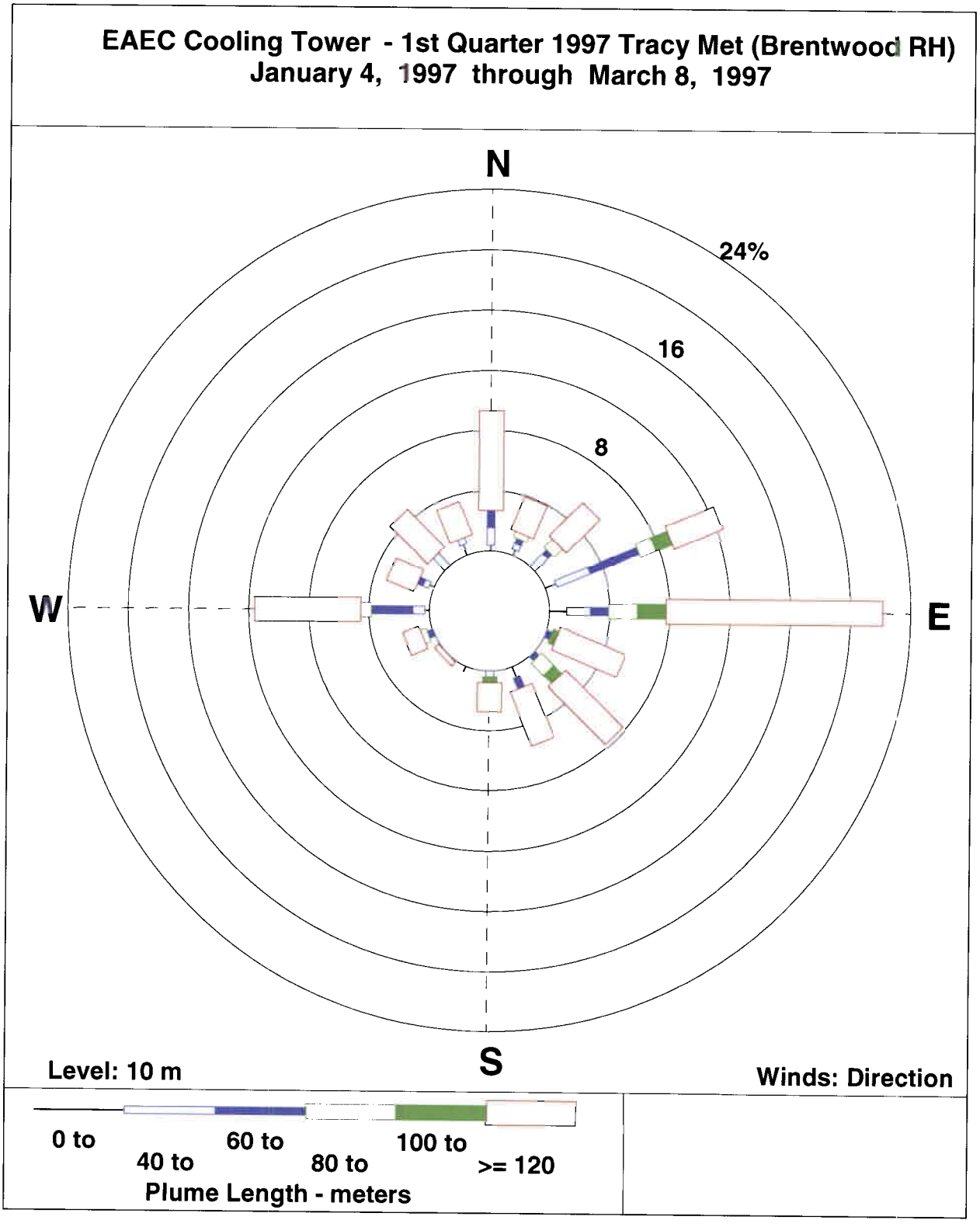

EAEC Cooling Tower - 1st Quarter 1997 Tracy Met (Brentwood RH)
January 4, 1997 through March 8, 1997
N
24%
16
8
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.1c

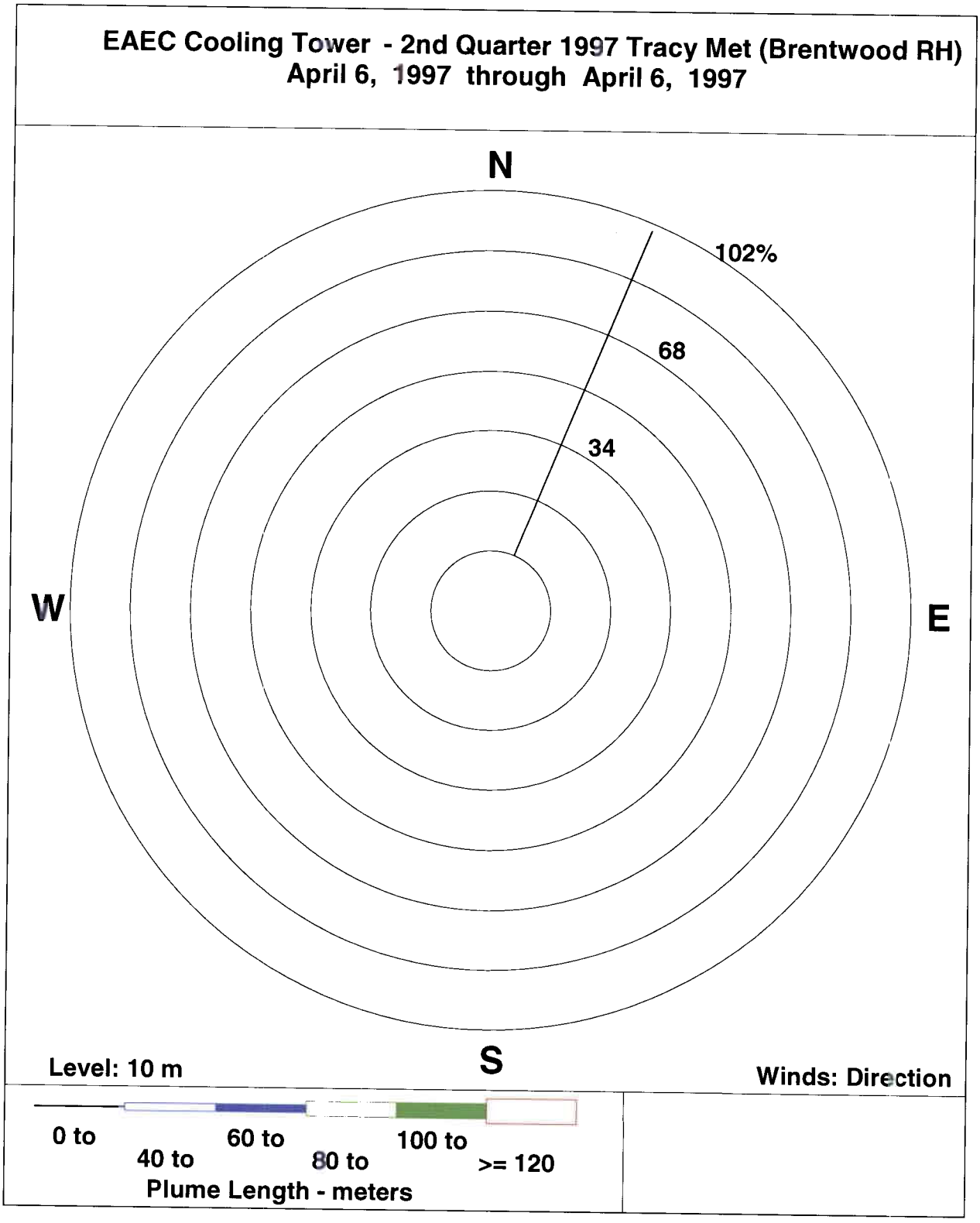

EAEC Cooling Tower - 2nd Quarter 1997 Tracy Met (Brentwood RH)
April 6, 1997 through April 6, 1997
N
102%
68
34
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.1d

No visible plumes predicted for the third calendar quarter.

Figure 6.1e

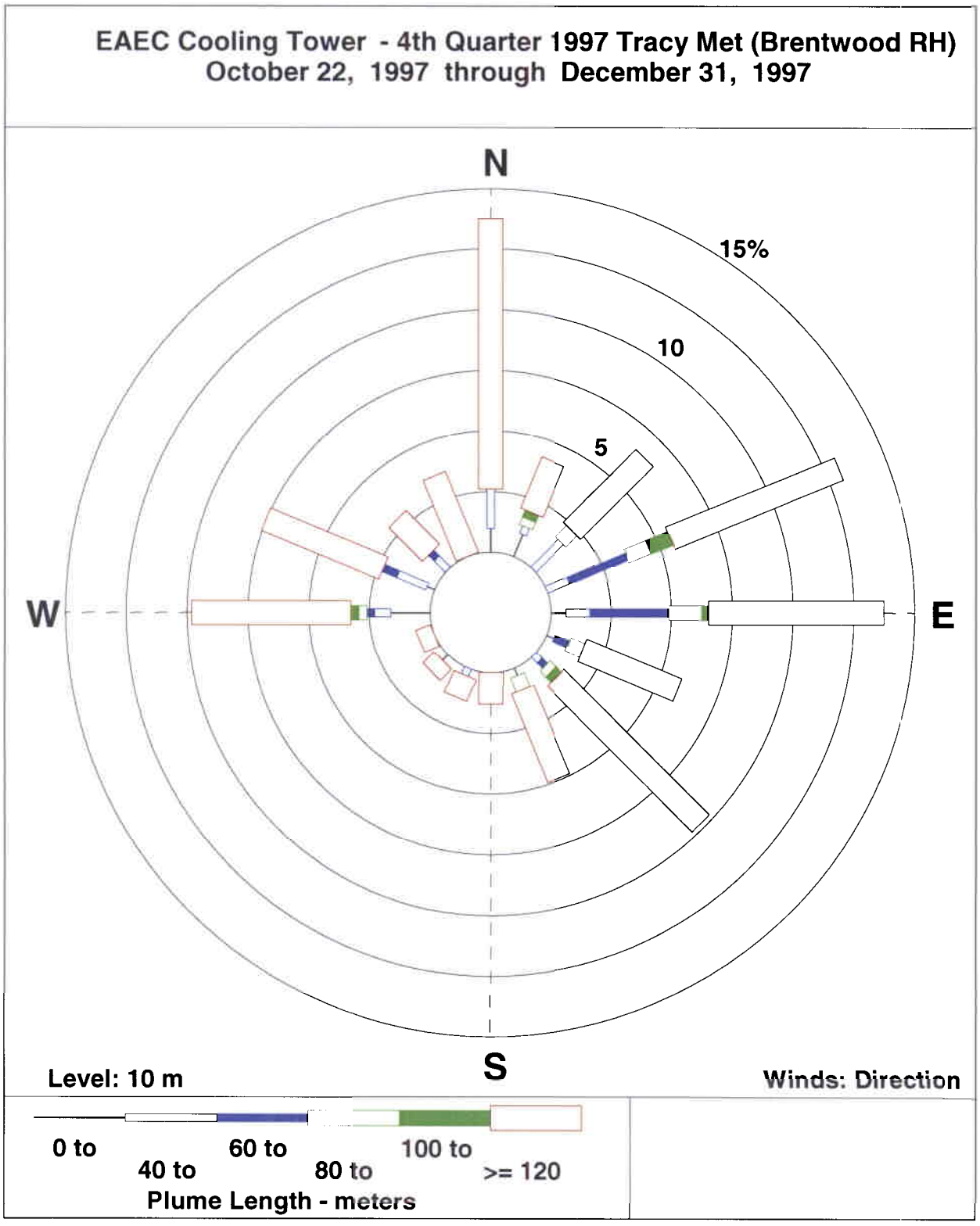

EAEC Cooling Tower - 4th Quarter 1997 Tracy Met (Brentwood RH)
October 22, 1997 through December 31, 1997
N
E
S
W
15%
10
5
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.2a

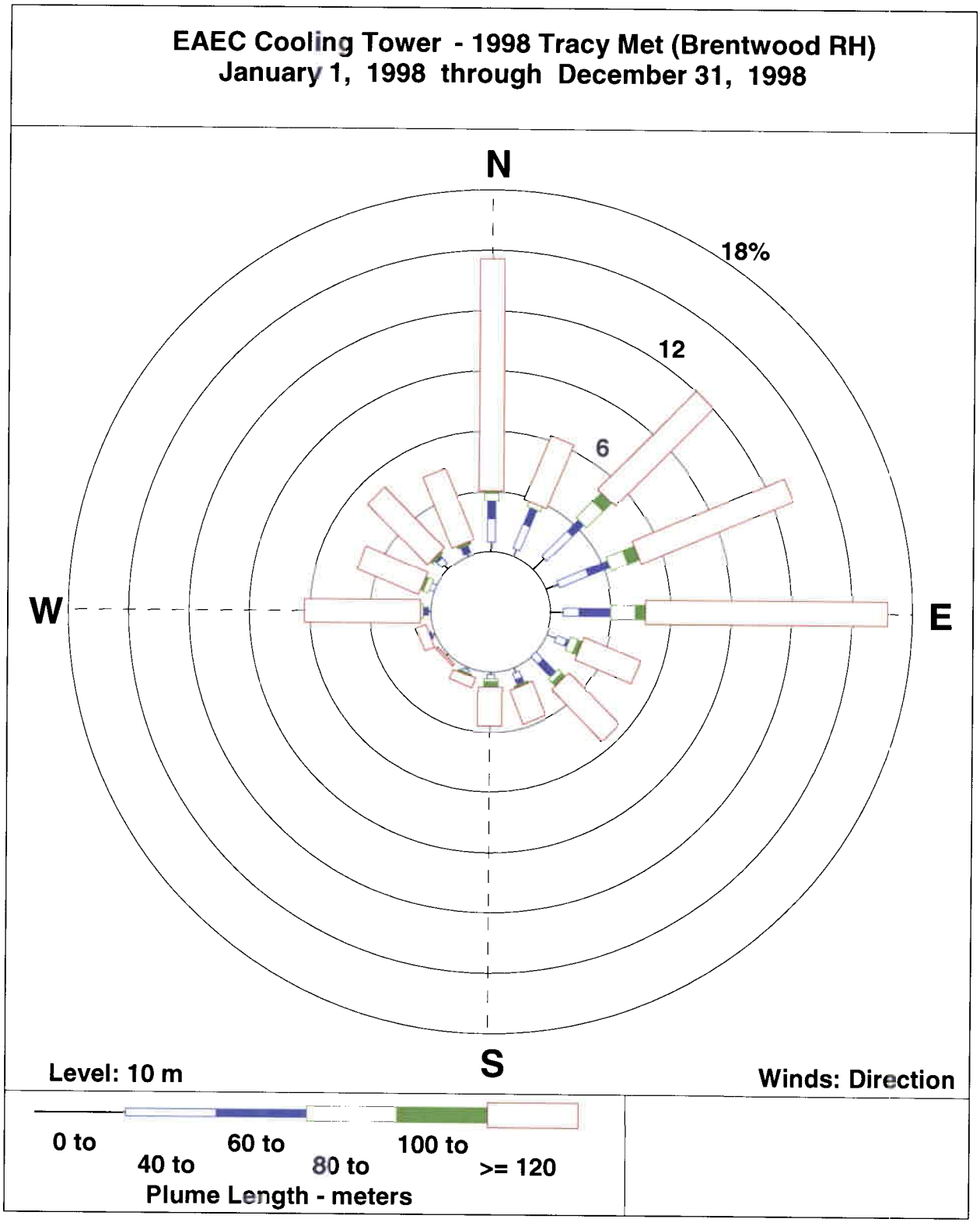

EAEC Cooling Tower - 1998 Tracy Met (Brentwood RH)
January 1, 1998 through December 31, 1998
N
E
S
W
18%
12
6
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.2b

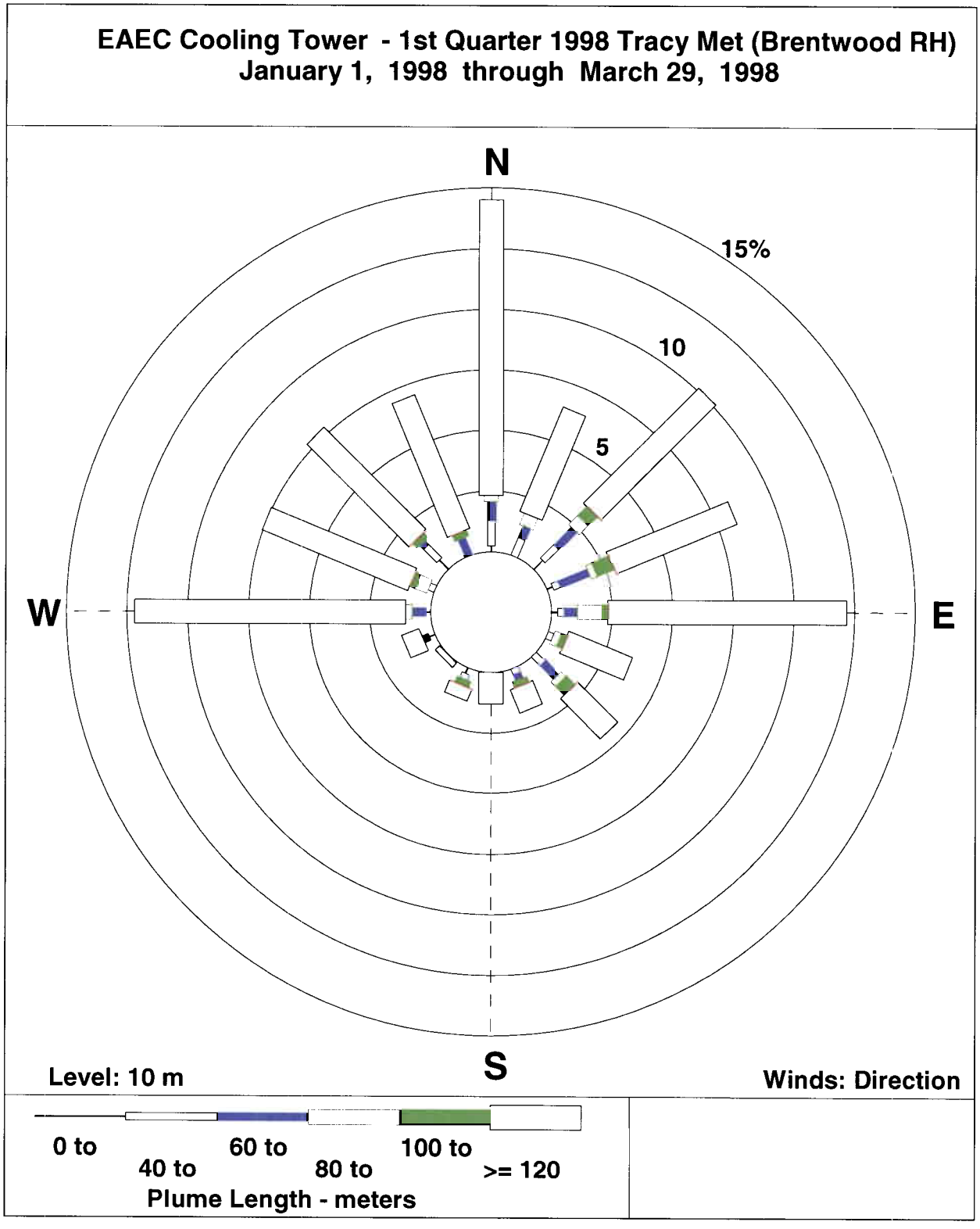

EAEC Cooling Tower - 1st Quarter 1998 Tracy Met (Brentwood RH)
January 1, 1998 through March 29, 1998
N
15%
10
5
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.2c

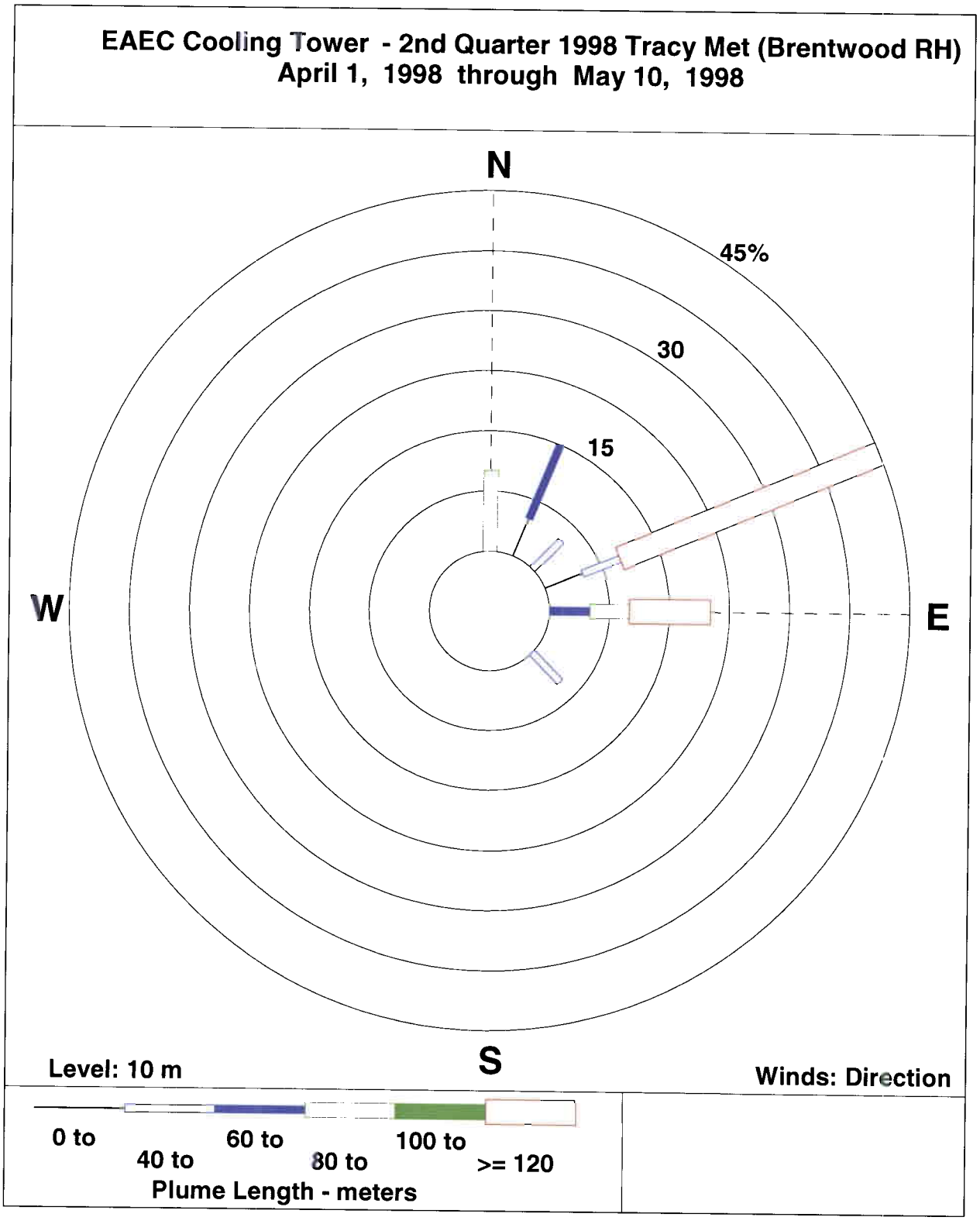

EAEC Cooling Tower - 2nd Quarter 1998 Tracy Met (Brentwood RH)
April 1, 1998 through May 10, 1998
N
45%
30
15
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.2d

No visible plumes predicted for the third calendar quarter.

Figure 6.2e

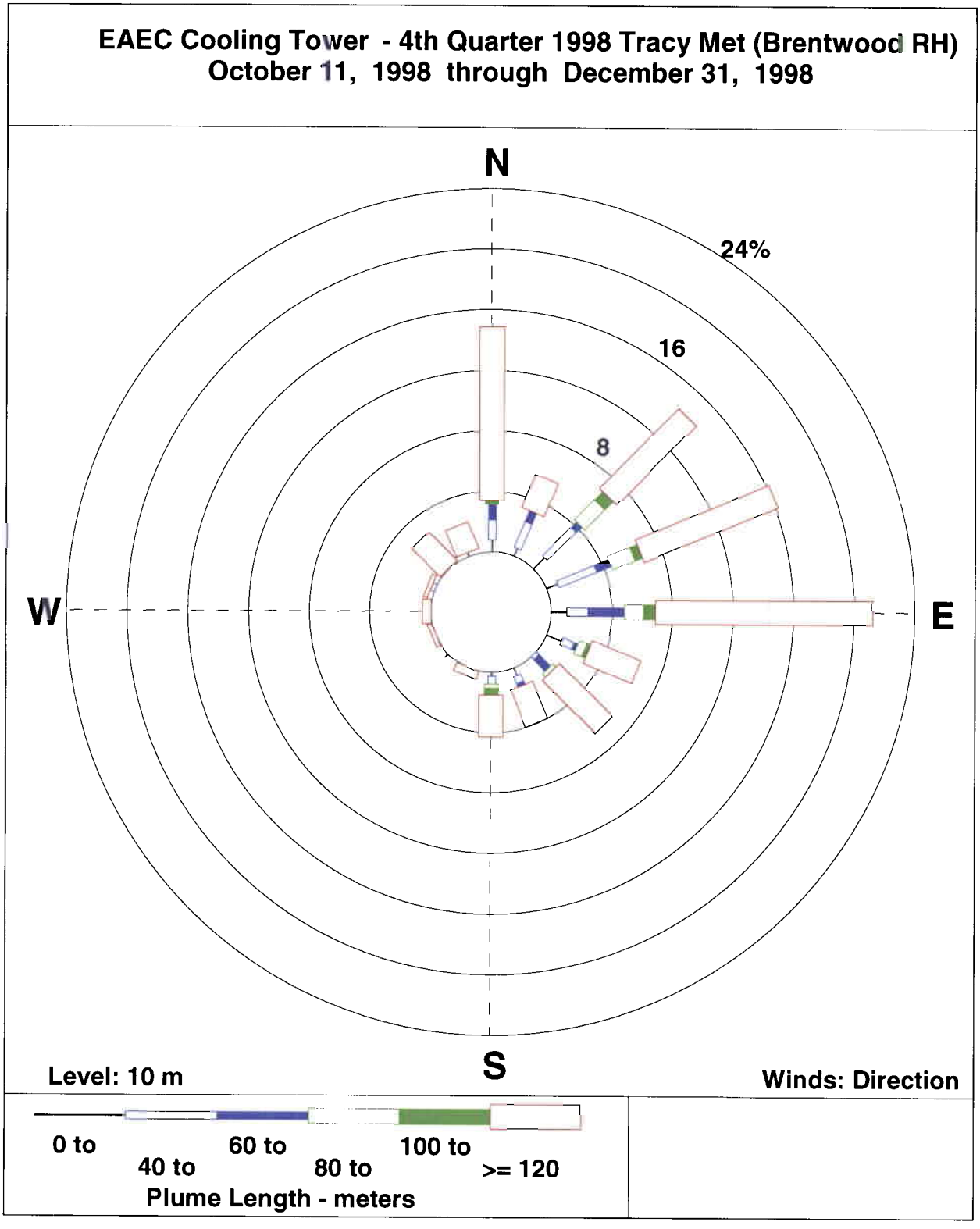

EAEC Cooling Tower - 4th Quarter 1998 Tracy Met (Brentwood RH)
October 11, 1998 through December 31, 1998
N
E
S
W
24%
16
8
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.3a

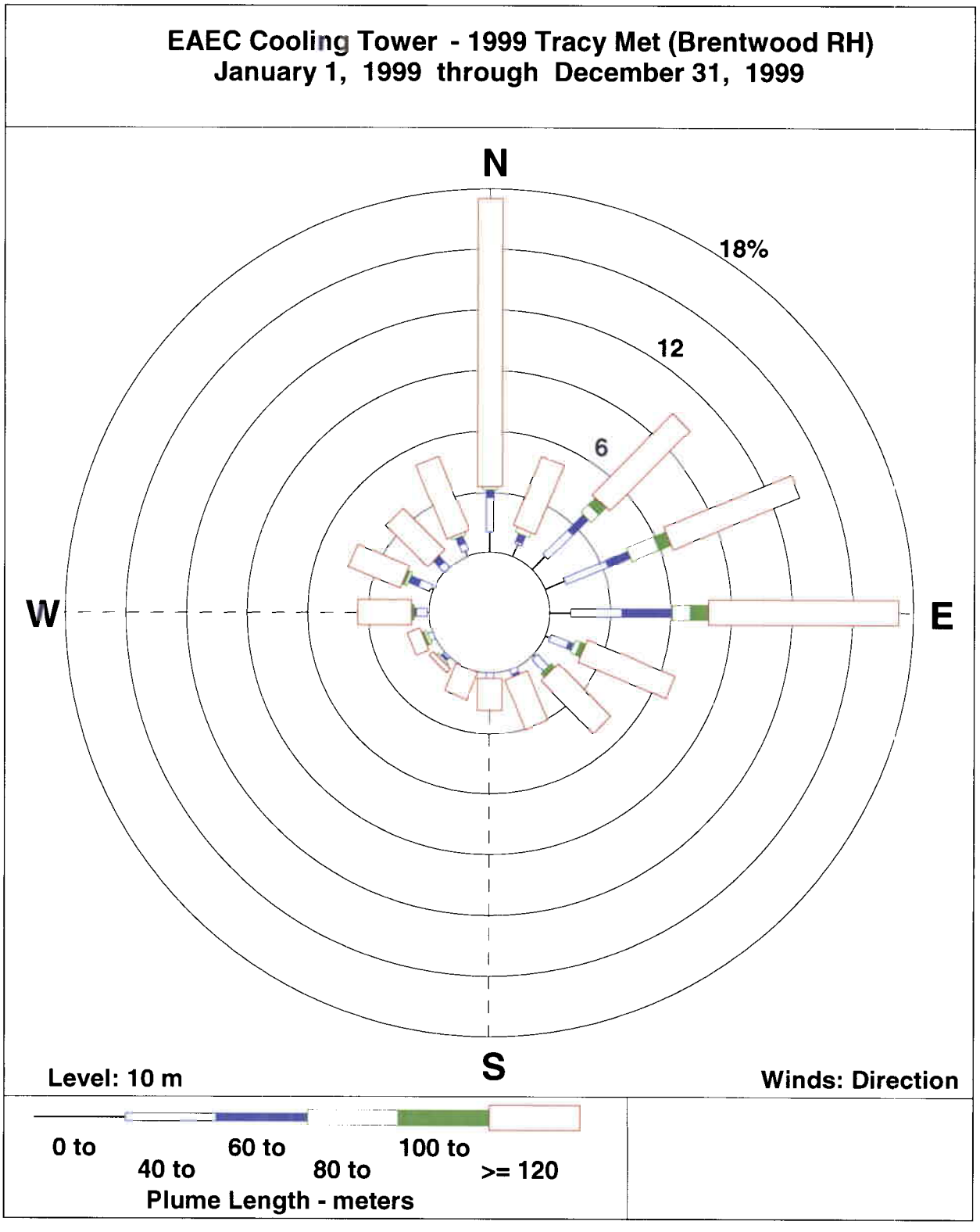

EAEC Cooling Tower - 1999 Tracy Met (Brentwood RH)
January 1, 1999 through December 31, 1999
N
18%
12
6
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.3b

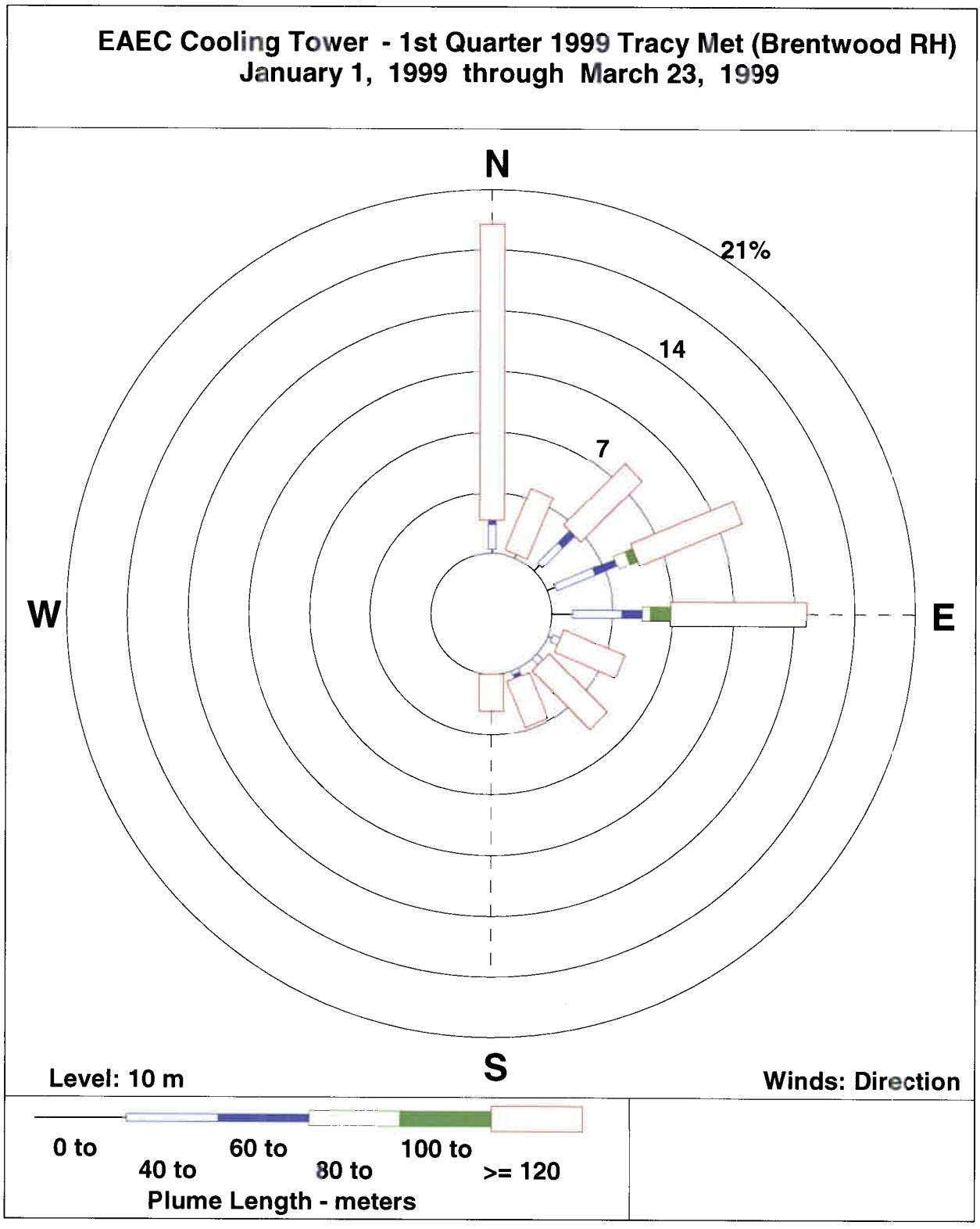

EAEC Cooling Tower - 1st Quarter 1999 Tracy Met (Brentwood RH)
January 1, 1999 through March 23, 1999
N
21%
14
7
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.3c

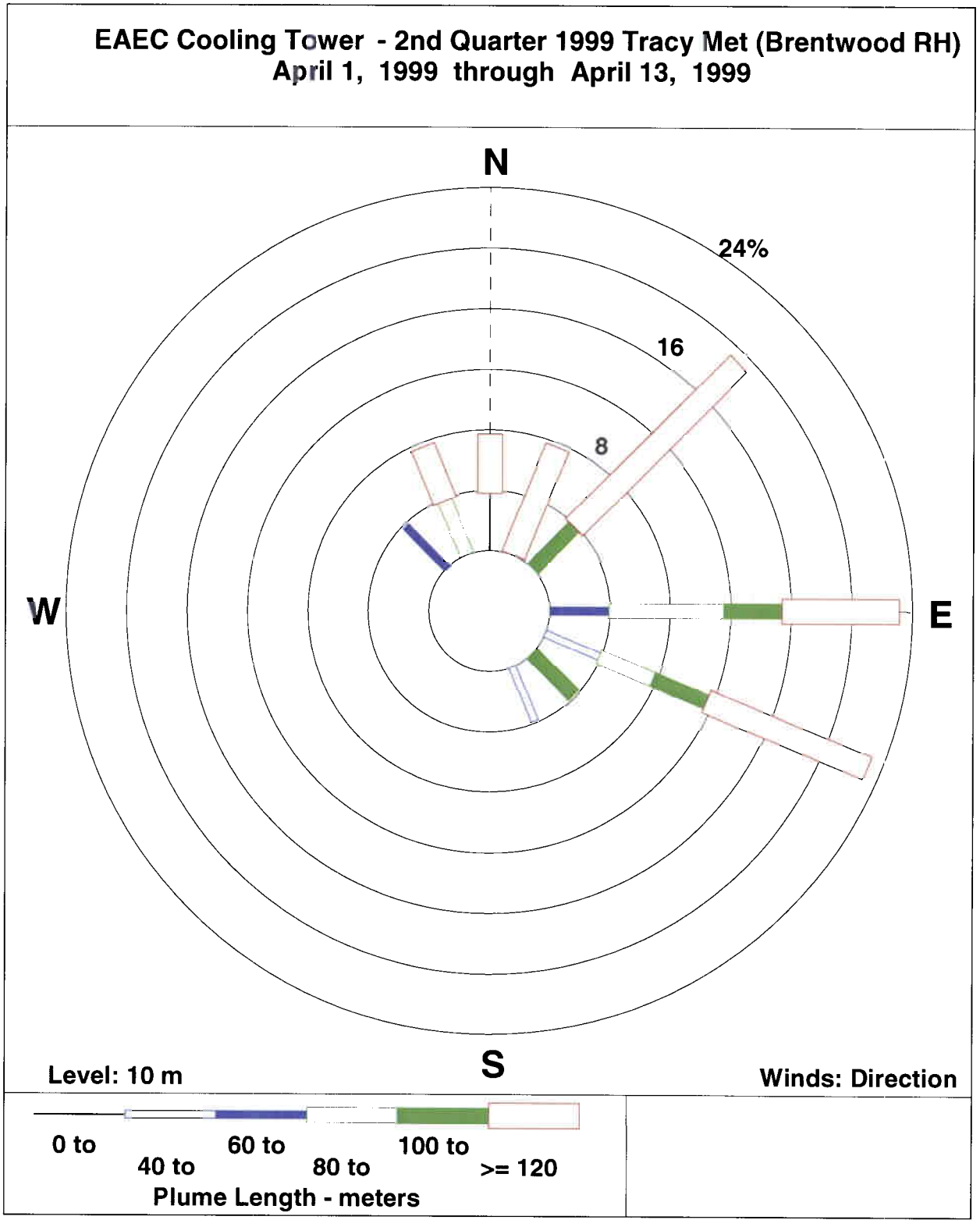
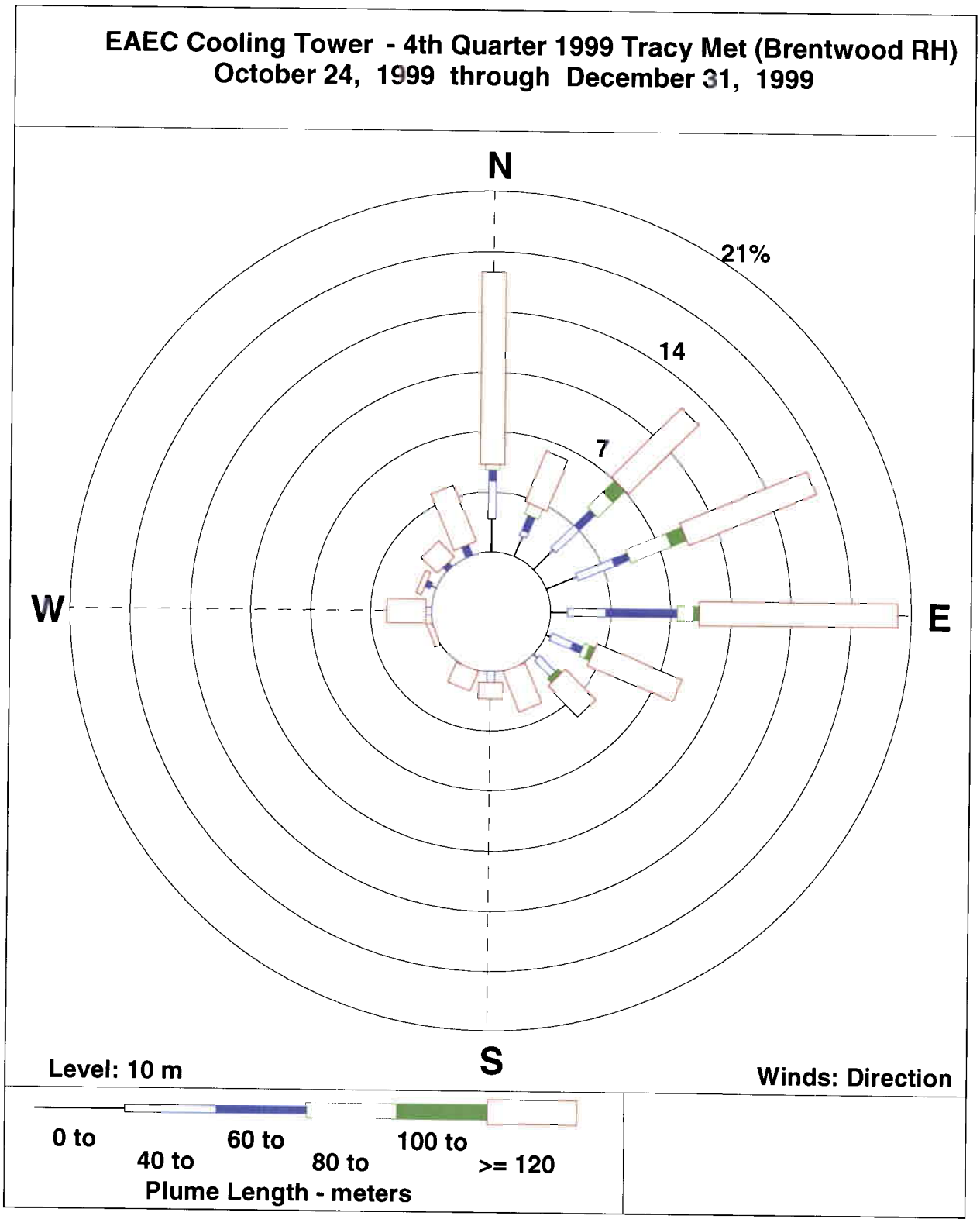

EAEC Cooling Tower - 2nd Quarter 1999 Tracy Met (Brentwood RH)
April 1, 1999 through April 13, 1999
N
24%
16
8
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 6.3d

No visible plumes predicted for the third calendar quarter.

Figure 6.3e


EAEC Cooling Tower - 4th Quarter 1999 Tracy Met (Brentwood RH)
October 24, 1999 through December 31, 1999
N
21%
14
7
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Response: The question is ambiguous, in that there is not a single combination of plume length, height and width that would be expected to occur during all daylight no-fog hours. The applicant has insufficient data to distinguish between fog and no-fog hours at the project site. The mean and maximum plume dimensions are presented in Table VIS-6.2. An electronic file containing a listing of all incidences of visible water vapor plumes predicted for the cooling towers, including the dimensions of each predicted plume, is being provided to the Commission under separate cover.

Table VIS-6.2
Cooling Tower Visible Water Plume Dimensions (meters; per cell; values are statistics for visible plumes)

	1997 Met Data	1998 Met Data	1999 Met Data
Maximum Plume Height	677	376	289
Average Plume Height	76	66	63
Maximum Plume Diameter	397	338	339
Average Plume Diameter	60	61	51

d. The total number of hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 6.a.

e. The percentage of the total number of hours that the plumes would be visible annually and seasonally;

Response: Table VIS-6.3 shows the percentage of total, daylight and nighttime hours per year when there is the potential for formation of a visible water vapor plume of various lengths from the cooling tower cells. These percentages are calculated based on the values shown in Table VIS-6.1.

Table VIS-6.3
Potential for Formation of a Visible Water Vapor Plume from Cooling Tower Cells
(percent of hours per year)

Plume Length (meters)	1997 Met Data			1998 Met Data			1999 Met Data		
	Total	Day	Night	Total	Day	Night	Total	Day	Night
All	6%	4%	9%	9%	5%	12%	8%	5%	12%

f. The total number of daylight hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 6.a.

g. The percentage of daylight hours that the plumes would be visible annually and seasonally;

Response: See response to Data Request 6.e.

h. The total number of daylight no-fog hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 6.a. The applicant has insufficient data to respond to this request.

i. The percentage of daylight no-fog hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 6.a. The applicant has insufficient data to respond to this request.

j. Tables showing the dimensions of plumes that would occur under each of these conditions for different frequencies; and

Response: See responses to Data Requests 6.a. and 6.c.

k. The assumptions, calculations, and data (including meteorological data) used to derive these estimates. Please provide 3 sets of the data electronically on CDs in addition to the printed copies.

Response: See introductory response to Data Request 6. Electronic copies of the requested information are provided under separate cover. The key stack parameters used for the cooling tower in this analysis are shown in Table VIS-6.4.

Table VIS-6.4 Exhaust Characteristics For Cooling Towers

Stack gas exit temperature	76°F (297.6°K)
Stack diameter	10.26 m
Stack gas exit velocity	10.019 m/s
Stack gas moisture content	1.54% weight
Stack gas mass flow (per cell)	7,542,126 lbs/hr (wet)

BACKGROUND

The AFC (p.8.11-21) discusses visible vapor plumes from the proposed HRSG stacks. However, the AFC does not provide quantified estimates of the size and frequency of the plumes.

DATA REQUEST

7. Using at least 5 years of meteorological data if available, please provide the following information regarding the project's HRSG stack visible plumes, using the CSVP model. If a model other than the CSVP model is proposed for use, please provide a copy and description of that model for staff review and approval prior to conducting the modeling analysis. Please specify whether the calculations are for each stack or for all stacks. If the calculations are for each stack, please estimate the combined effects of all stacks.

Response: Please see introductory response to Data Request 6.

a. The total number of daylight hours annually and seasonally;

Response: Table VIS-7.1 shows the number of hours per year that there is the potential for formation of a visible water vapor plume of various lengths from each HRSG stack. The analysis assumes that each HRSG is operated for 8,760 hours per year. During the hours between 6 a.m. and 8 p.m., the units are assumed to operate at full load with duct firing and power steam augmentation; during all other hours, the units are assumed to operate at full load, but without duct firing or power steam augmentation. The analysis was performed for each of the three years of meteorological data available.

Table VIS-7.1 Potential for Formation of a Visible Water Vapor Plume from HRSGs (hours per year)

Plume Length (meters)	1997 Met Data			1998 Met Data			1999 Met Data		
	Total	Day	Night	Total	Day	Night	Total	Day	Night
All	1292	524	768	1891	777	1114	1596	604	992
Days with 1 hour or more of a visible water vapor plume									
All	156	154	120	215	212	174	205	201	163

A seasonal distribution of these hours is presented in the plume roses included as Figures VIS-7.1a through VIS-7.3el.

b. The total number of daylight no-fog hours annually and seasonally;

Response: See response to Data Request 7.a. The applicant has insufficient data to respond to this request.

c. The length, height, and width of plumes predicted to occur 10% of all daylight hours and all daylight no-fog hours annually and seasonally;

Response: The question is ambiguous, in that there is not a single combination of plume length, height and width that would be expected to occur during all daylight no-fog hours. The applicant has insufficient data to distinguish between fog and no-fog conditions at the site. The mean and maximum plume dimensions are presented in Table VIS-7.2. An electronic file containing a listing of all incidences of visible water vapor plumes predicted for the cooling towers, including the dimensions of each predicted plume, is being provided to the Commission under separate cover.

Figure 7.1a

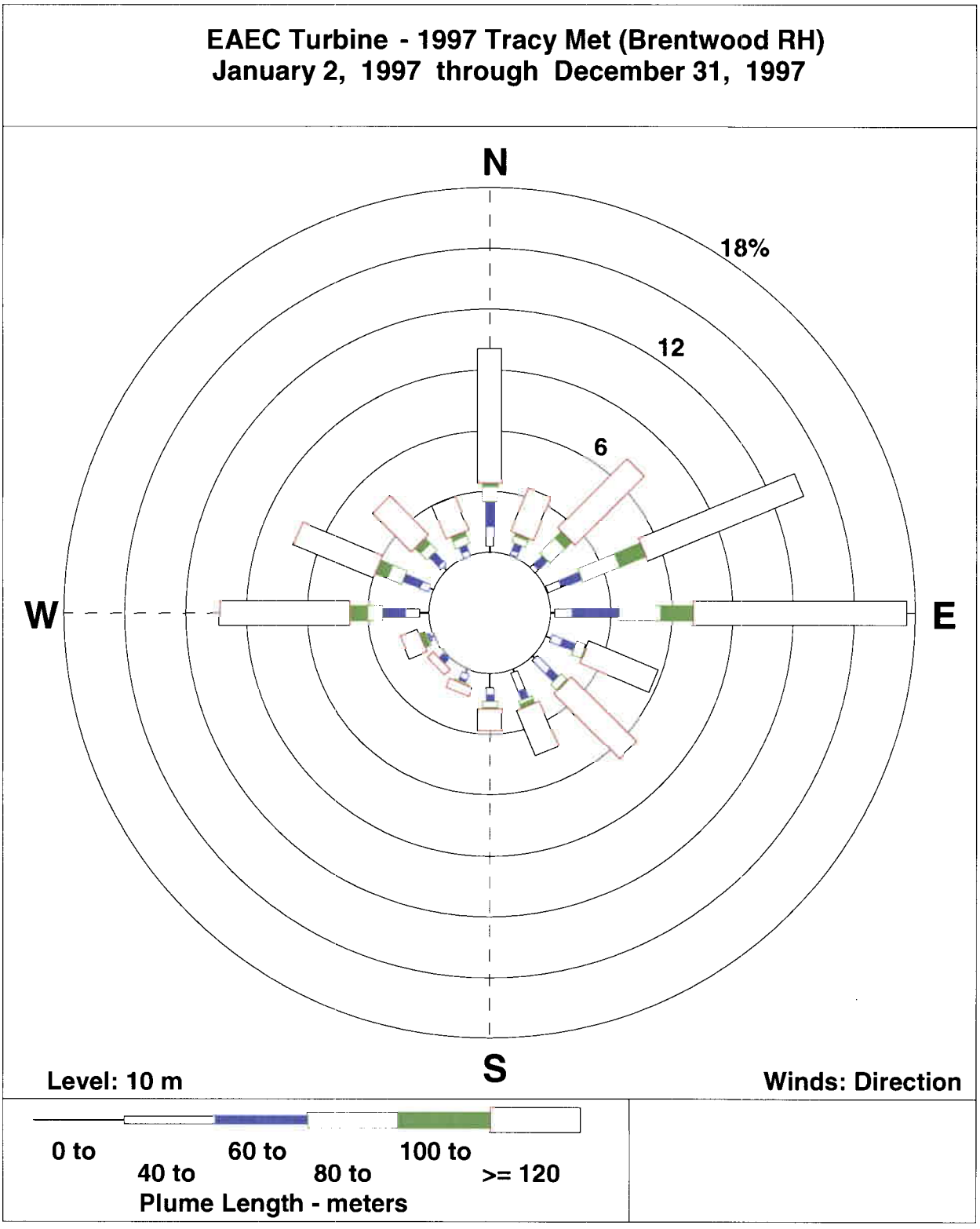

EAEC Turbine - 1997 Tracy Met (Brentwood RH)
January 2, 1997 through December 31, 1997
N
18%
12
6
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.1b

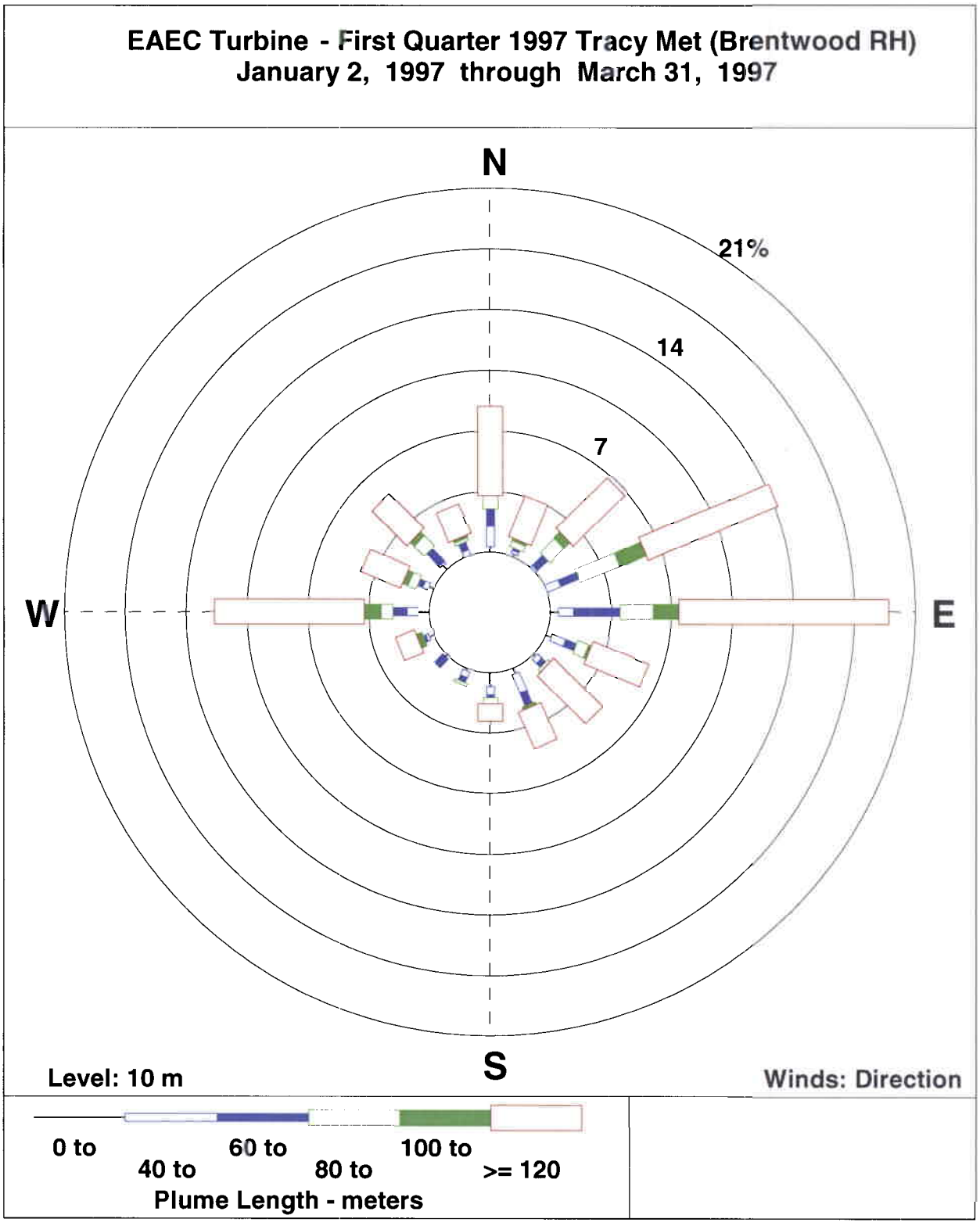

EAEC Turbine - First Quarter 1997 Tracy Met (Brentwood RH)
January 2, 1997 through March 31, 1997
N
21%
14
7
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.1c

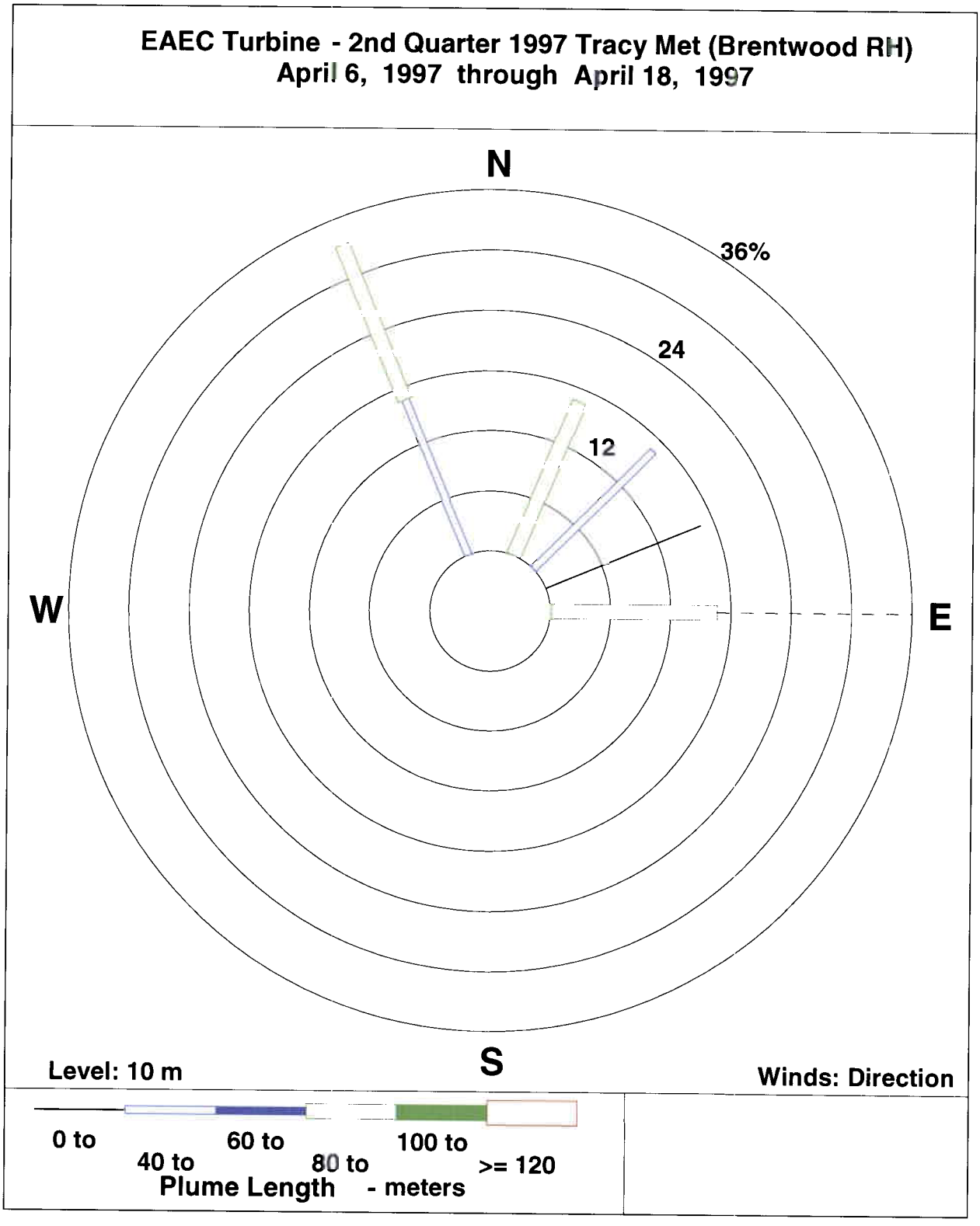

EAEC Turbine - 2nd Quarter 1997 Tracy Met (Brentwood RH)
April 6, 1997 through April 18, 1997
N
36%
24
12
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.1d

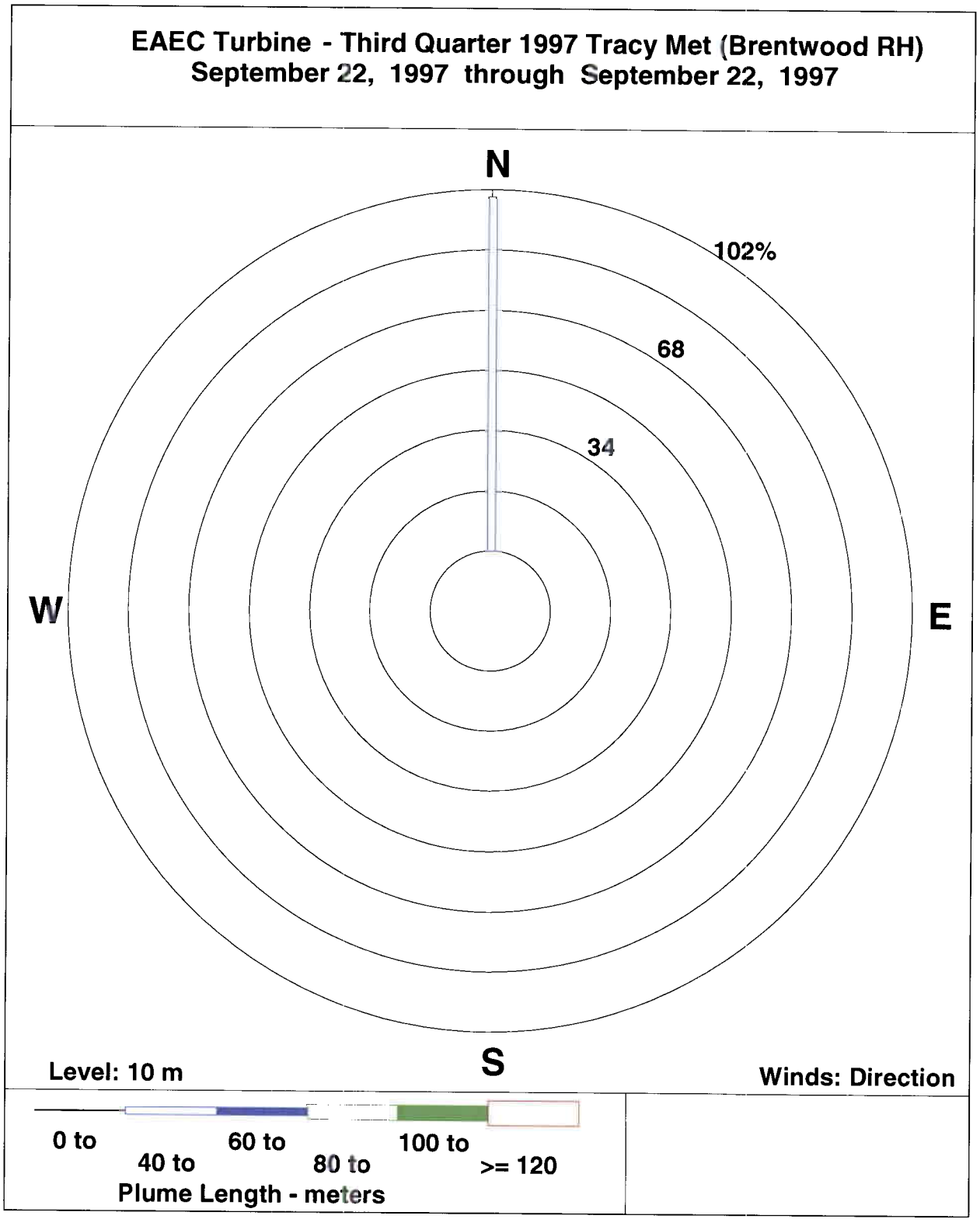

EAEC Turbine - Third Quarter 1997 Tracy Met (Brentwood RH)
September 22, 1997 through September 22, 1997
N
102%
68
34
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.1e

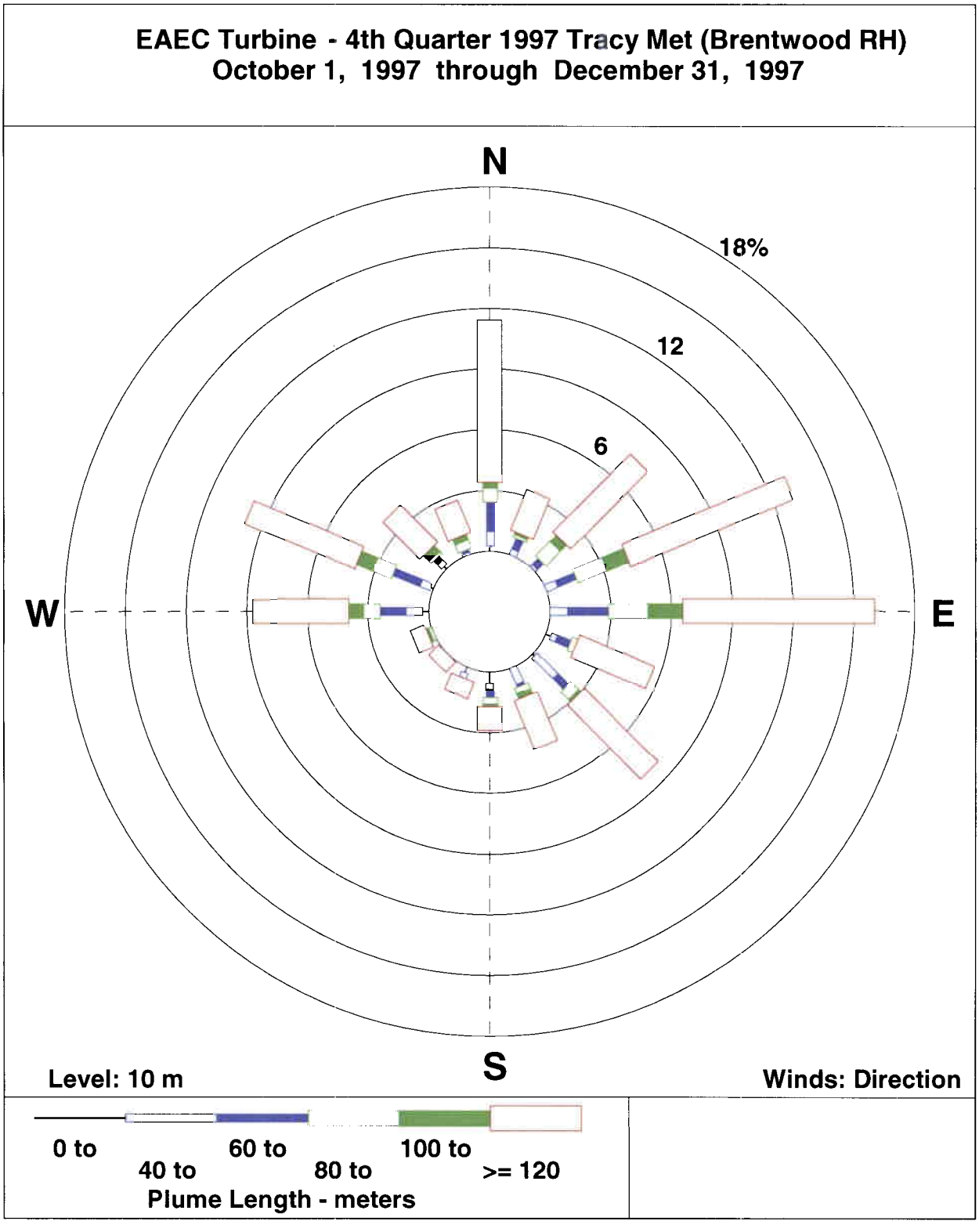

EAEC Turbine - 4th Quarter 1997 Tracy Met (Brentwood RH)
October 1, 1997 through December 31, 1997
N
18%
12
6
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.2a

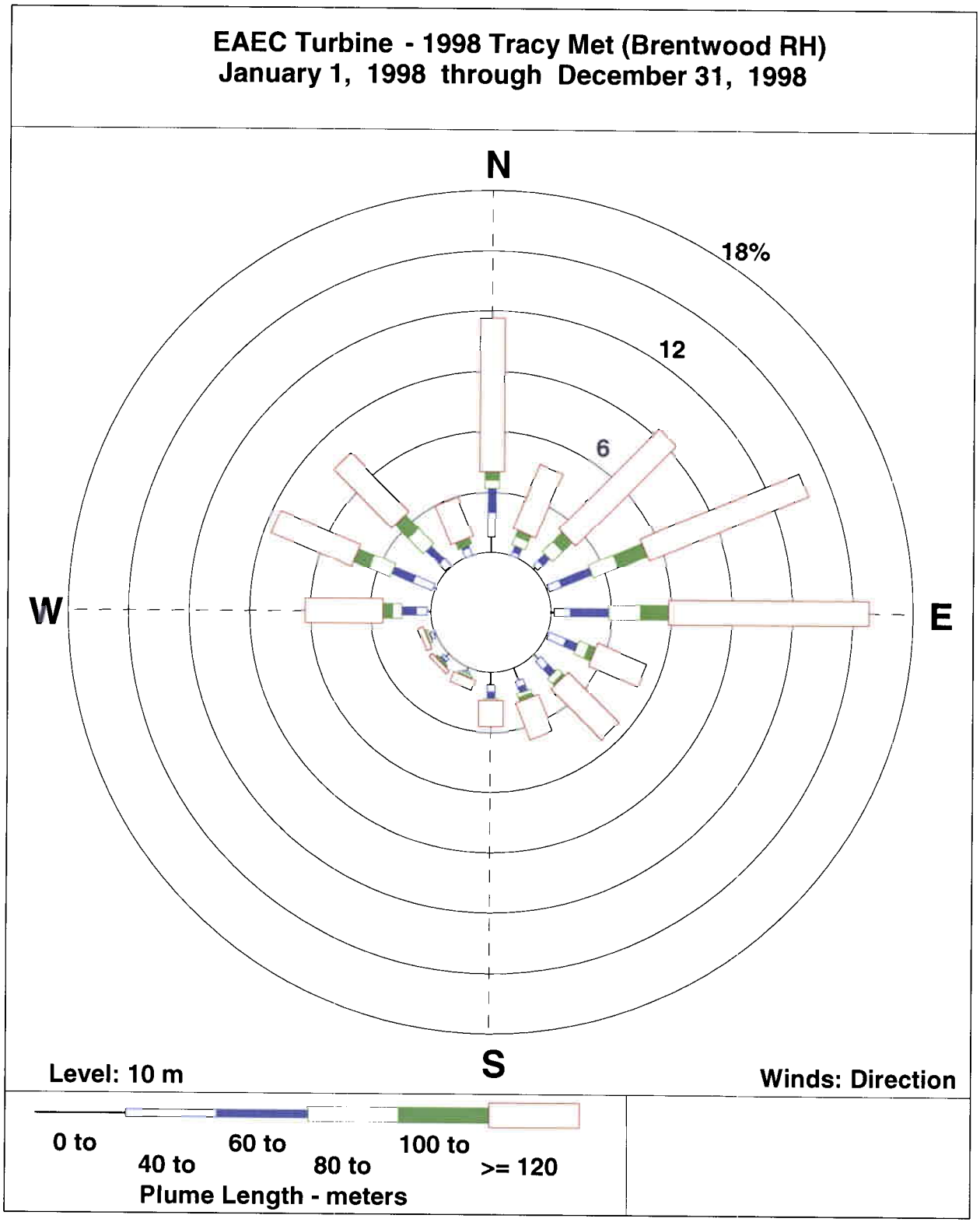

EAEC Turbine - 1998 Tracy Met (Brentwood RH)
January 1, 1998 through December 31, 1998
N
E
S
W
18%
12
6
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.2b

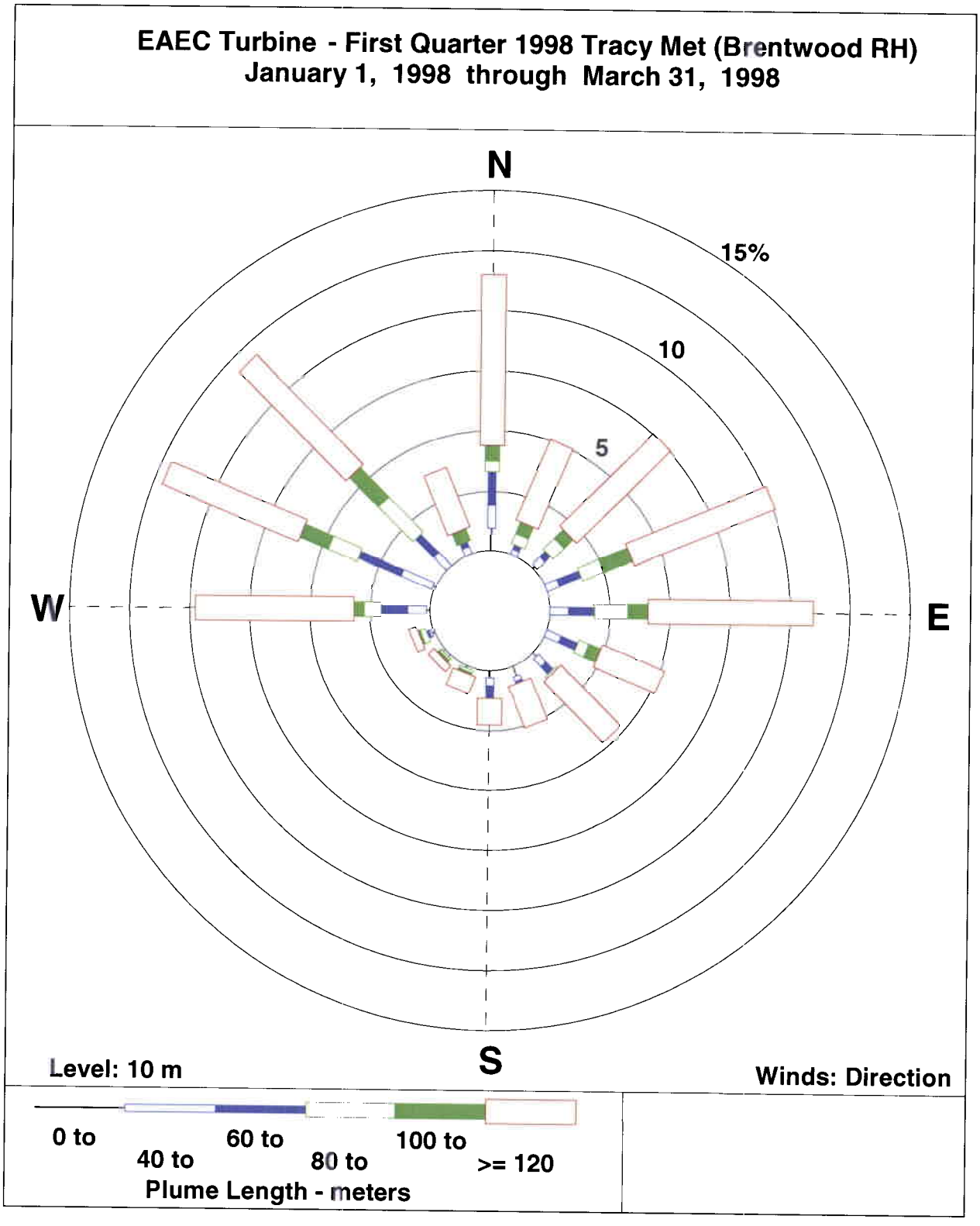

EAEC Turbine - First Quarter 1998 Tracy Met (Brentwood RH)
January 1, 1998 through March 31, 1998
N
15%
10
5
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.2c

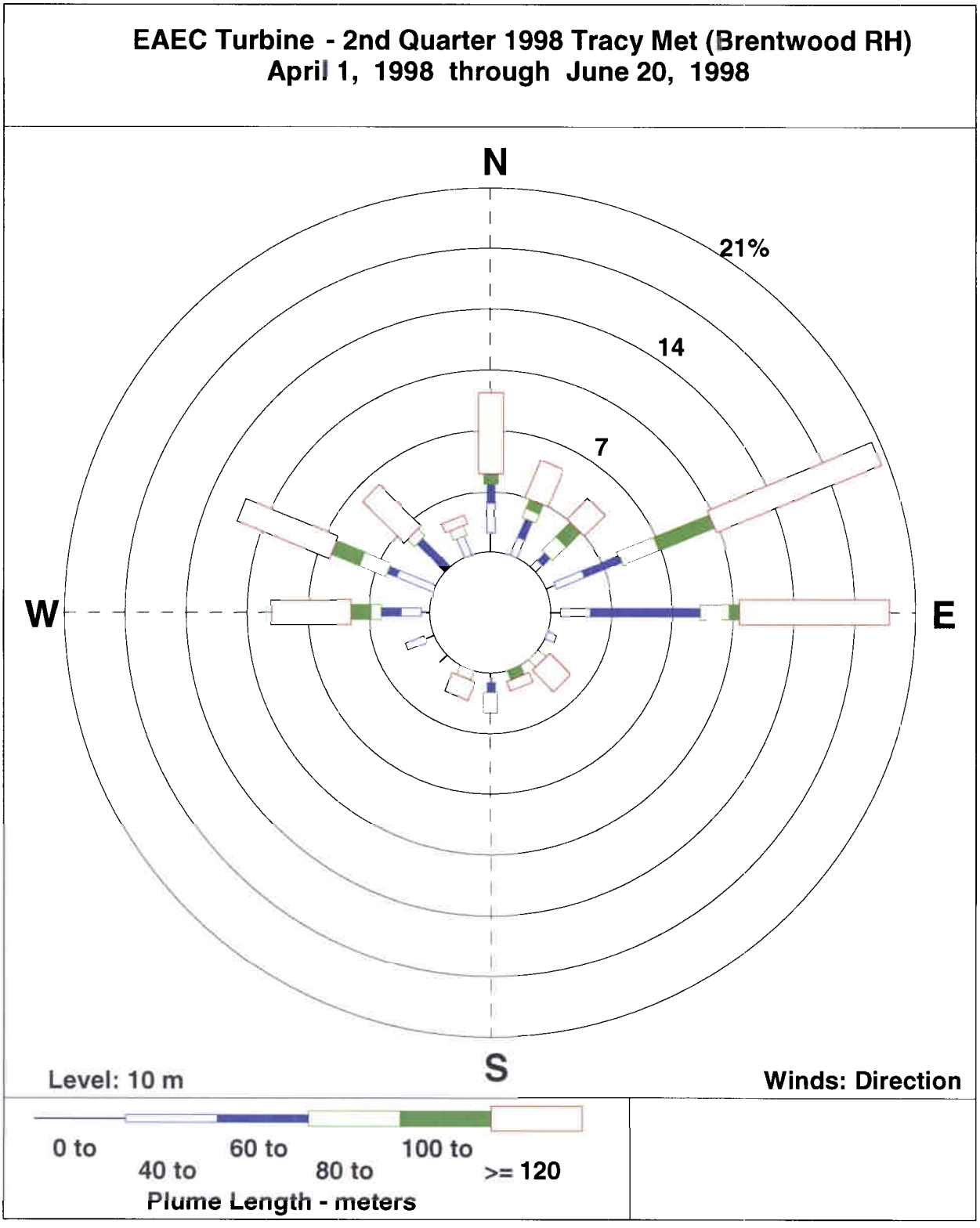

EAEC Turbine - 2nd Quarter 1998 Tracy Met (Brentwood RH)
April 1, 1998 through June 20, 1998
N
W
E
S
21%
14
7
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.2d

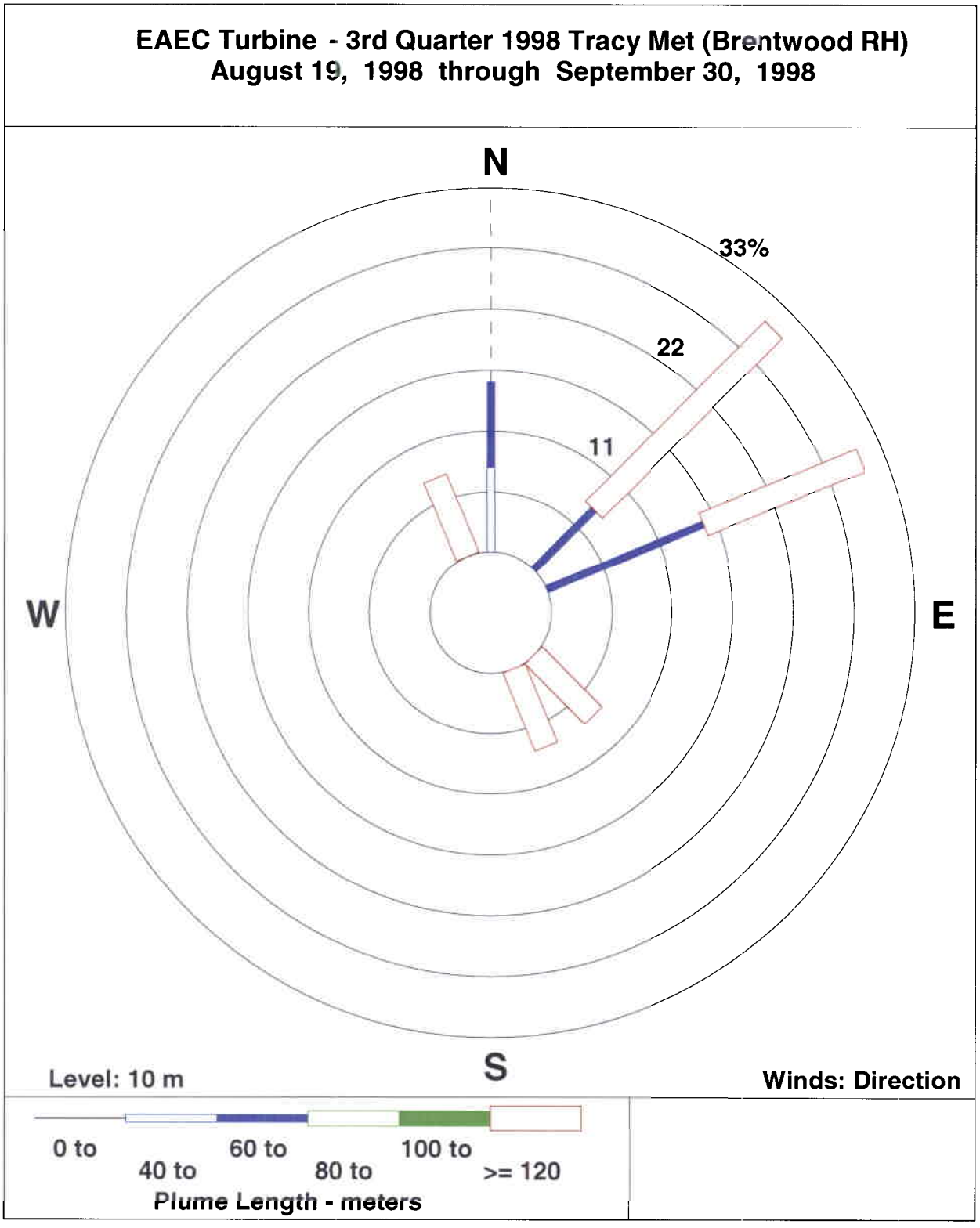

EAEC Turbine - 3rd Quarter 1998 Tracy Met (Brentwood RH)
August 19, 1998 through September 30, 1998
N
33%
22
11
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.2e

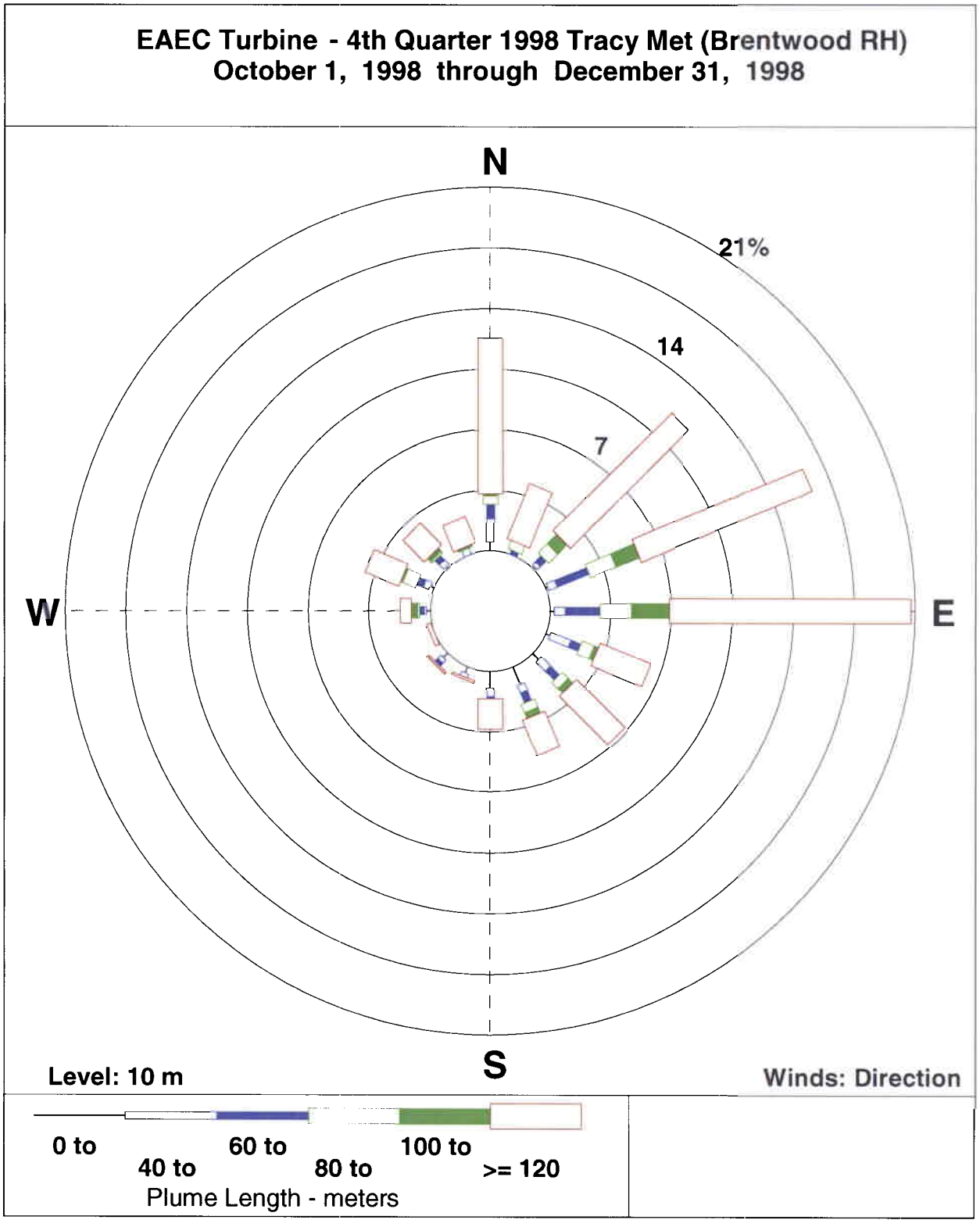

EAEC Turbine - 4th Quarter 1998 Tracy Met (Brentwood RH)
October 1, 1998 through December 31, 1998
N
21%
14
7
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.3a

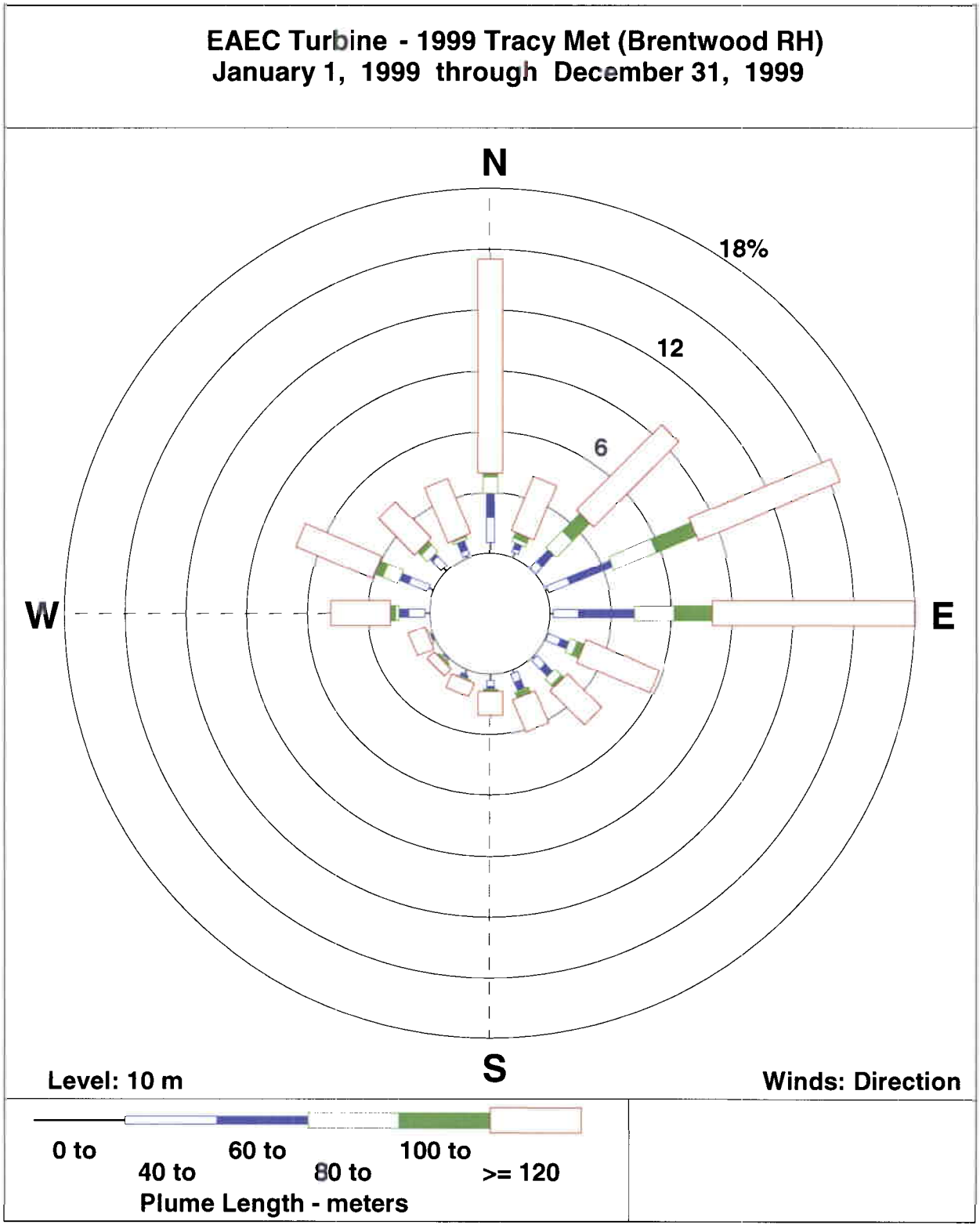

EAEC Turbine - 1999 Tracy Met (Brentwood RH)
January 1, 1999 through December 31, 1999
N
18%
12
6
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.3b

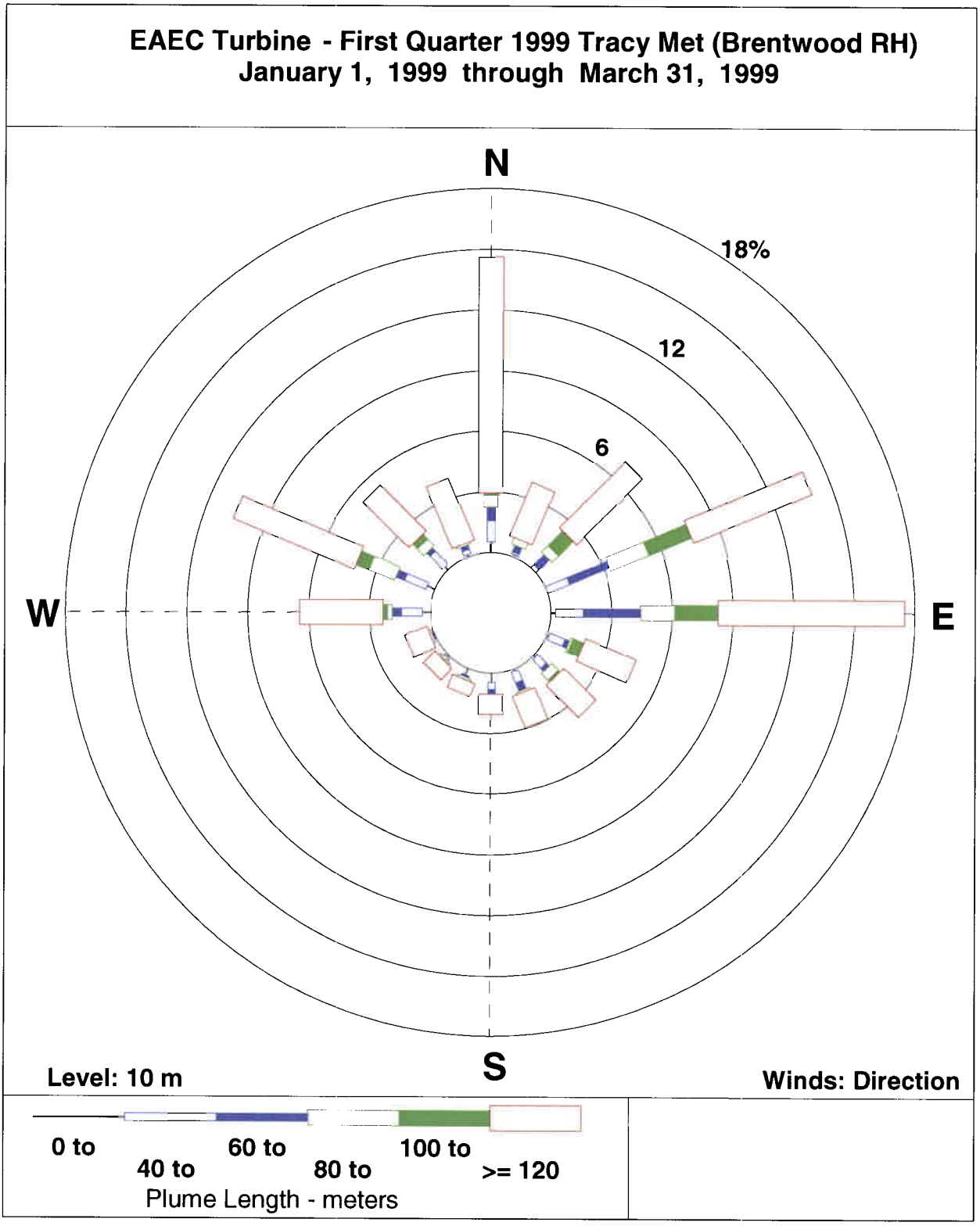

EAEC Turbine - First Quarter 1999 Tracy Met (Brentwood RH)
January 1, 1999 through March 31, 1999
N
E
S
W
18%
12
6
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.3c

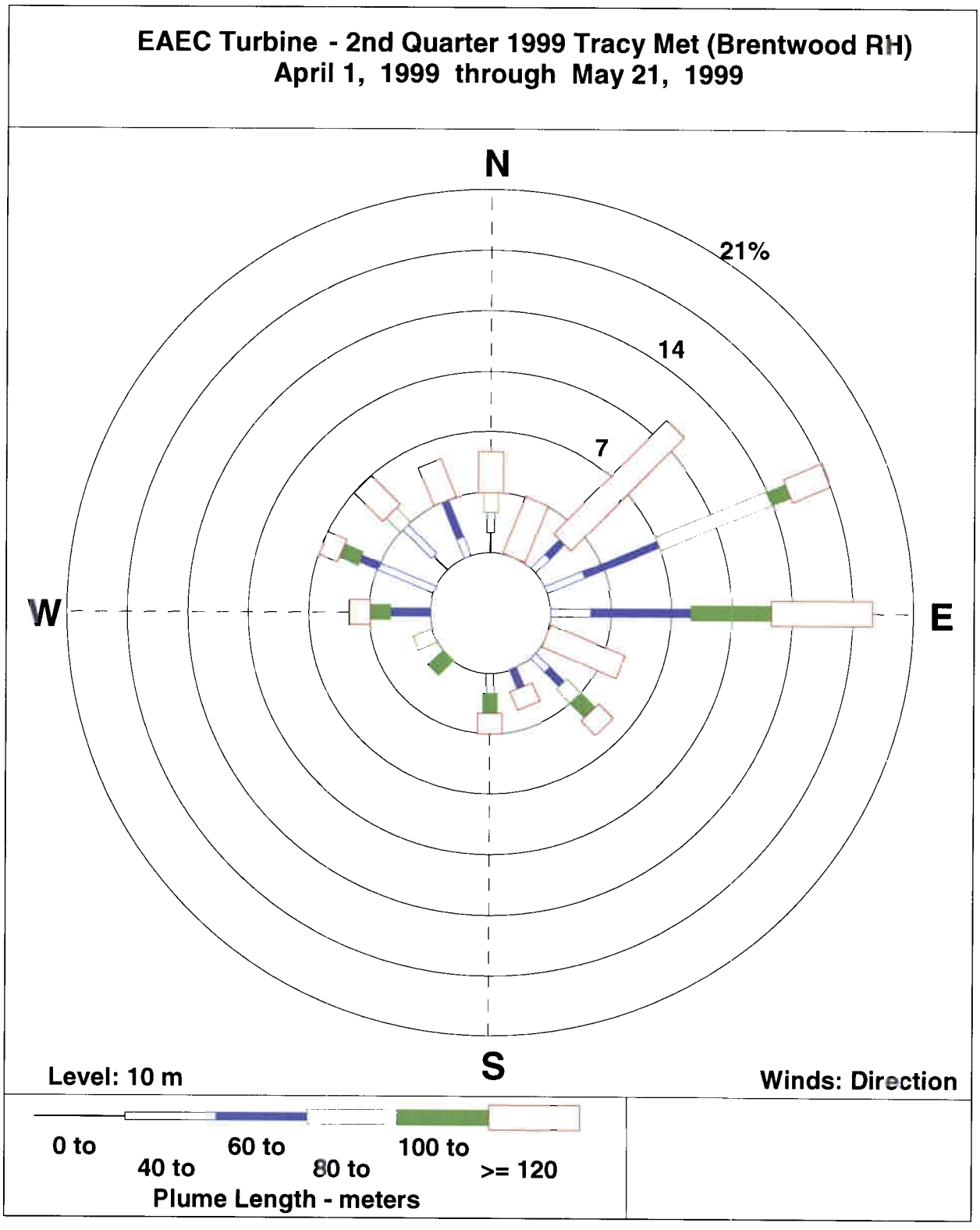

EAEC Turbine - 2nd Quarter 1999 Tracy Met (Brentwood RH)
April 1, 1999 through May 21, 1999
N
21%
14
7
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.3d

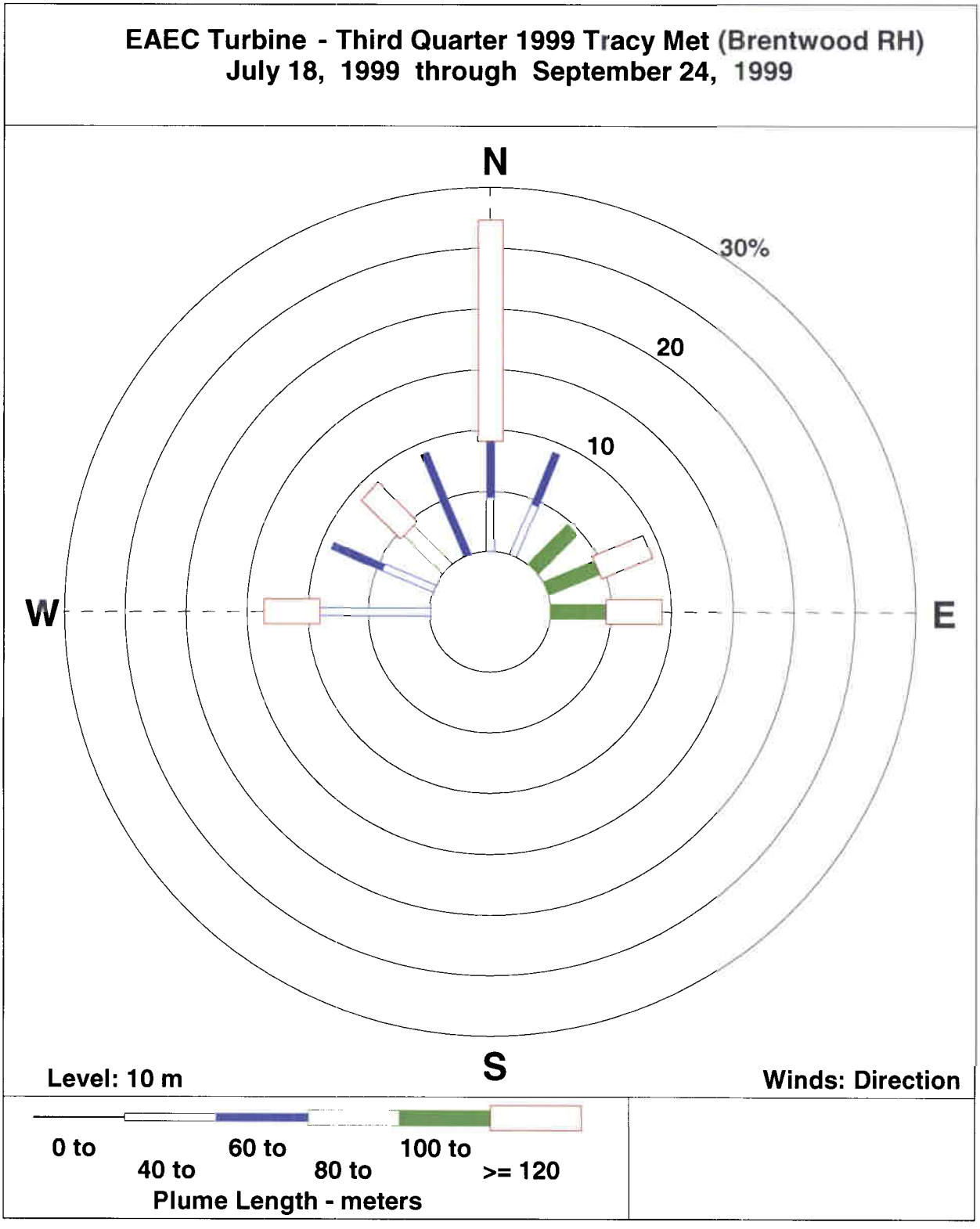

EAEC Turbine - Third Quarter 1999 Tracy Met (Brentwood RH)
July 18, 1999 through September 24, 1999
N
30%
20
10
W
E
S
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Figure 7.3e

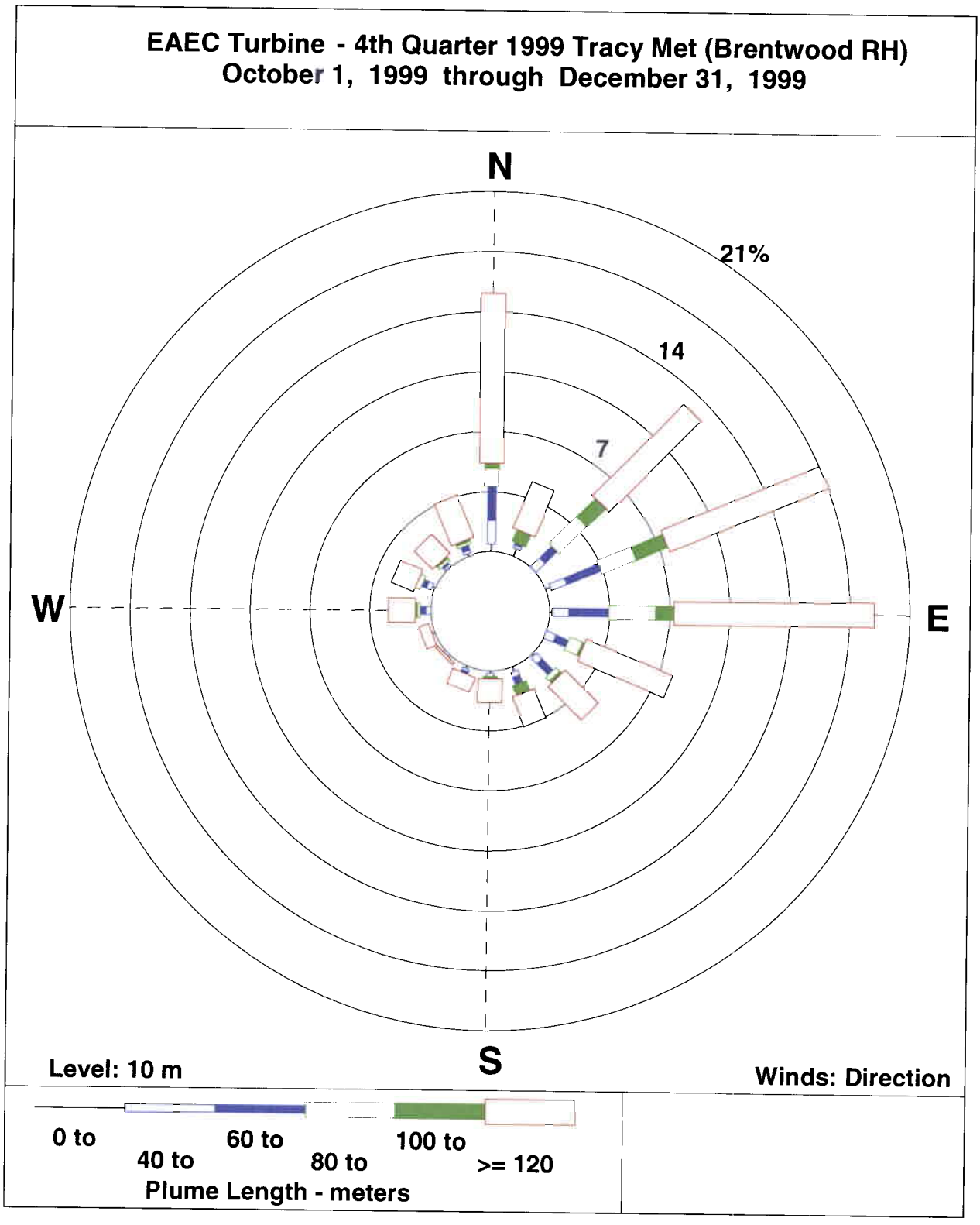

EAEC Turbine - 4th Quarter 1999 Tracy Met (Brentwood RH)
October 1, 1999 through December 31, 1999
N
E
S
W
21%
14
7
Level: 10 m
Winds: Direction
0 to
40 to
60 to
80 to
100 to
>= 120
Plume Length - meters

Table VIS-7.2 HRSG Visible Water Plume Dimensions (meters; per stack; values are statistics for visible plumes)

	1997 Met Data	1998 Met Data	1999 Met Data
Maximum Plume Height	801	823	805
Average Plume Height	137	124	116
Maximum Plume Diameter	604	633	636
Average Plume Diameter	99	88	82

d. The total number of hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 7.a.

e. The percentage of the total number of hours that the plumes would be visible annually and seasonally;

Response: Table VIS-7.3 shows the percentage of total, daylight and nighttime hours per year when there is the potential for formation of a visible water vapor plume of various lengths from the HRSGs. These percentages are calculated based on the values shown in Table VIS-7.1.

Table VIS-7.3 Potential for Formation of a Visible Water Vapor Plume from HRSGs (percent of hours per year)

Plume Length (meters)	1997 Met Data			1998 Met Data			1999 Met Data		
	Total	Day	Night	Total	Day	Night	Total	Day	Night
All	15%	12%	18%	22%	18%	25%	18%	14%	23%

f. The total number of daylight hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 7.a.

g. The percentage of daylight hours that the plumes would be visible annually and seasonally;

Response: Table VIS-7.3 shows the percentage of total, daylight and nighttime hours per year when there is the potential for formation of a visible water vapor plume of various lengths from the HRSGs. These percentages are calculated based on the values shown in Table VIS-7.1.

h. The total number of daylight no-fog hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 7.a. The applicant has insufficient data to respond to this request.

i. The percentage of daylight no-fog hours that a plume would be visible annually and seasonally;

Response: See response to Data Request 7.a. The applicant has insufficient data to respond to this request.

j. Tables showing the dimensions of plumes that would occur hourly and under each of these conditions for different frequencies; and

Response: See responses to Data Requests 7.a. and 7.c.

k. The assumptions, calculations, and data (including meteorological data) used to derive these estimates. Please provide 3 CDs containing the data in addition to the printed copies.

Response: See introductory response to Data Request 6. Electronic copies of the requested information are provided under separate cover. The key stack parameters used for the HRSGs in this analysis are shown in Table VIS-7.4.

Table VIS-7.4 Exhaust Characteristics For New Equipment	
HRSG Stack (full load operation) With Duct Burner	
Stack gas exit temperature	188°F (334.1°K)
Stack diameter	5.639 m
Stack gas exit velocity	19.467 m/s
Stack gas moisture content	11.20% vol
	7.18% wt
Stack gas mass flow	3,672,694 lbs/hr
Stack gas average molecular weight	28.11 lbs/lb-mol (wet)
HRSG Stack (full load operation) Without Duct Burner	
Stack gas exit temperature	188°F (334.1°K)
Stack diameter	5.639 m
Stack gas exit velocity	19.181 m/s
Stack gas moisture content	8.43% vol
	5.37% wt
Stack gas mass flow	3,641,095 lbs/hr
Stack gas average molecular weight	28.29 lbs/lb-mol (wet)

EAST ALTAMONT ENERGY CENTER
DATA REQUEST AND RESPONSE SET #1 (01-AFC-4)

Technical Area: Land Use
CEC Authors: Mark R. Hamblin
EAEC Authors: Karen Parker/Thomas Priestley/Jerry Salamy

BACKGROUND

AFC page 8.4-2 states that the Byron Airport in Contra Costa County is approximately 3 miles to the northwest of the proposed East Altamont Energy Center project site (see attached map).

Energy Commission staff was informed during a preliminary project review phone conversation with Dan Gargus, Aviation Safety Officer with Caltrans Aeronautics Program, that the proposed location of the power generation facility and/or transmission lines near the Byron Airport may potentially present a concern to the Federal Aviation Administration (FAA). A portion of the proposed project site is shown to be within the Clear Zone of the Byron Airport.

According to Mr. Gargus, the FAA during the past two years has spent $18 million on the Byron Airport. Byron Airport is a County maintained and operated facility. The Airport is a general aviation facility that services the Bay Area as a reliever airport. The airport maintains a 6,000-foot X 100-foot runway that allows it to handle general aviation and business/corporate jets.

The airport has been approved by the FAA for instrument approach landings and therefore requires a greater clearance area free from above ground structures, including transmission line towers.

Mr. Gargus also presented potential concerns pertaining to the amount of on-site lighting that the new power generation facility may introduce into the airspace and the amount or level of electromagnetic interference that may be introduced to aircraft communication and navigation systems landing or taking off at the Airport. He suggests the applicant contact John Pfeifer, Manager, Airport Districts Office (650) 876-2778 at the FAA's Western Regional Headquarters.

DATA REQUESTS

8. Staff requests that the applicant provide the following items:

    a. a copy of the FAA's written determination to the applicant's filing of an FAA Form 7460 - "Notice of Proposed Construction or Alteration" for the project (see attached application form);

    Response: East Altamont Energy Center, Limited Liability Company (LLC) submitted a Federal Aviation Administration Form 7460-1 on June 7, 2001. The Federal Aviation Administration determined that the EAEC

project will not cause a hazard to air navigation. Attached as LU-1 is the Federal Aviation Administration's response letter.

b. a description of the amount of light to be generated into the airspace by the proposed project;

Response: The EAEC will require nighttime lighting for operational safety and security. To reduce any offsite impacts of this requirement, lighting at the facility will be restricted to areas required for safety, security, and operation. Exterior lights will be hooded, and lights will be directed onsite so that significant light or glare will not be created. Fixtures of a non-glare type will be specified. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits will be provided, thus allowing these areas to remain unilluminated at most times, minimizing the amount of lighting potentially visible offsite. In response to Data Requests #3 (above) EAEC, LLC will present photographs of the Sutter Energy Center, south of Yuba City and the Los Medanos Energy Center in Pittsburg. These photographs will provide examples of the amount of light expected to be generated from the EAEC into the airspace.

c. a description of the amount/level of electromagnetic interference that may affect aircraft communication and navigational systems taking-off or landing at the Byron Airport; and

Response: The EAEC will be designed and constructed to comply with all applicable regulations. Those regulations applicable to communication/navigational system interference are Title 47, Code of Federal Regulations, Part 15.25 and the California Public Utilities Commission General Order 52. In addition, the project will need to comply with the CEC's radio interference and television interference criteria used on other projects. Section 5.0 and Appendix 5 of the EAEC AFC presents the expected electromagnetic interference from the project. These data show that the project is not expected to cause interference to microwave or radio frequency transmissions. Table 8c-1 presents the applicable laws, ordinances, regulations, and standards to which the project will comply.

TABLE 8C-1 COMMUNICATIONS INTERFERENCE LAWS, ORDINANCES, AND STANDARDS APPLICABLE TO EAEC ELECTRIC TRANSMISSION

LORS	Applicability	AFC Reference
Title 47 CFR Section 15.25, "Operating Requirements, Incidental Radiation"	Prohibits operations of any device emitting incidental radiation that causes interference to communications. The regulation also requires mitigation for any device that causes interference.	Section 5.2.2 Section 5.5.2.1 Section 5.5.2.2 Section 5.5.2.3.3 Section 5.5.2.4
General Order 52 (GO-52), CPUC	Covers all aspects of the construction, operation, and maintenance of power and communication lines and specifically applies to the prevention or mitigation of inductive interference.	Section 5.2.2 Section 5.2.2.1 Section 5.5.2.2 Section 5.5.2.4
CEC staff, Radio Interference and Television Interference (RI-TVI) Criteria (Kern River Cogeneration) Project 82-AFC-2, Final Decision, Compliance Plan 13-7	Prescribes the CEC's RI-TVI mitigation requirements, developed and adopted by the CEC in past siting cases.	Section 5.2.2.1 Section 5.2.2.2 Section 5.5.2.2

d. a discussion of the potential for plumes that may be generated by the proposed facility to enter the airspace.

Response: Responses to Data Requests #6 and #7 identify the potential plumes from the project's cooling tower and heat recovery steam generator exhaust stacks. Based on the analysis presented above, the plumes from these project features are not expected to obscure aviation or vehicle navigation in the project area.

9. Staff requests that the applicant provide a copy of the current FAA approved "Approach and Clear Zone Plan" for the Byron Airport showing the exact location of the proposed power generation facility and transmission towers on it.

Response: Based on discussions with the Byron Airport staff (K.C. Coyle 925-646-5722), the Approach and Clear Zone Plan does not undergo review and approval by the FAA, but that the Airport Layout Plan does undergo FAA review and approval. According to the Approach and Clear Zone Plan contained in the *East Contra Costa County Airport Master Plan Report, Byron, California*, dated May 1986 (Master Plan), a portion of the EAEC lies within the 20:1 conical surface on the southeast side of Byron Airport. The proposed site is located approximately 2.8 miles from the nearest point of the nearest runway, Runway 12-30. This runway is currently 4,350 feet in length, with a possible expansion to 6,000 feet under consideration by the County (Master Plan, 1986). A copy of the Approach and Clear Zone Plan, marked with the proposed location of the EAEC, is attached as Figure LU-1.

Attachment Visual Simulations

KOP1 - Existing view

ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP2 - Existing view

ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP3 - Existing view

KOP4 - Existing view

KOP5 - Existing view

KOP 6 - Existing View

E072001002SAC exhibit01

Visual Simulatio
East Altamont Energy Center AF

KOP1- Visual simulation of project at start of operation

ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP2 - Visual simulation of project at start of operation

ENVIRONMENTAL VISION

Visual Simulation
East Altamont Energy Center AFC

KOP3 - Visual simulation of project at start of operation

KOP4 - Visual simulation of project at start of operation

ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP5 - Visual simulation of project at start of operation

ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP1 - Visual simulation of project at 20 years

ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP2 - Visual simulation of project at 20 years

ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP3 - Visual simulation of project at 20 years

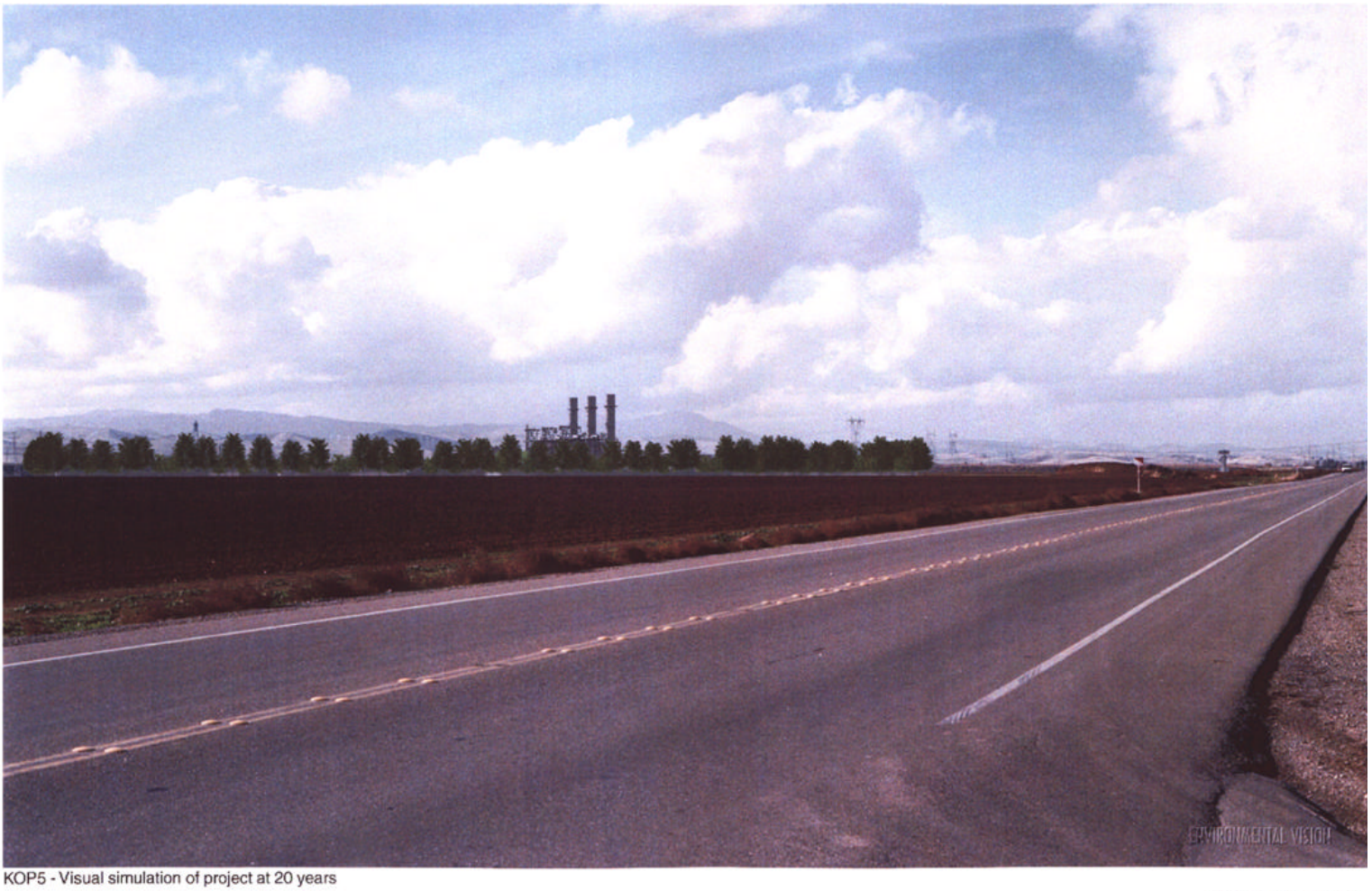
ENVIRONMENTAL VISION

Visual Simulatio
East Altamont Energy Center AF

KOP4- Visual simulation of project at 20 years

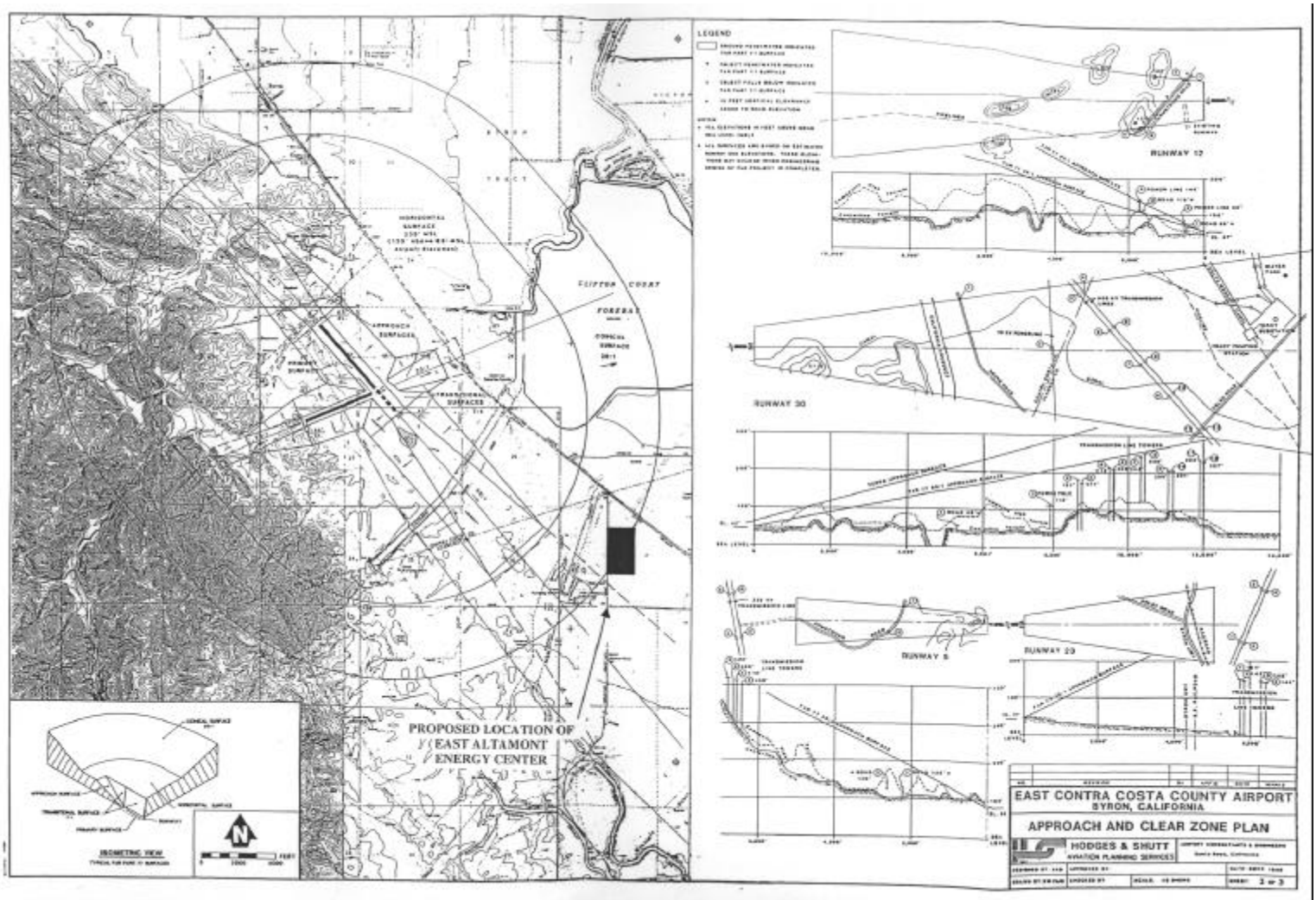
ENVIRONMENTAL VISION

Visual Simulation
East Altamont Energy Center AFC



KOP5 - Visual simulation of project at 20 years

Figure LU-1



Source: Hodges and Shutt, East Contra Costa County Airport Master Plan Report, Byron, California. May 1986.

Figure LU-1

Attachment LU-1

Federal Aviation Administration
Western/Pacific Region, AWP-520
P. O. Box 92007
Los Angeles, CA 90009

AERONAUTICAL STUDY
No: 01-AWP-2169-OE

ISSUED DATE: 06/28/01

STEVE DEYOUNG
EAST ALTAMOUNT ENERGY CENTER
6700 KOLL CENTER PARKWAY, STE 200
PLEASANTON, CA 94566

** DETERMINATION OF NO HAZARD TO AIR NAVIGATION **

The Federal Aviation Administration has completed an aeronautical study under the provisions of 49 U.S.C., Section 44718 and, if applicable, Title 14 of the Code of Federal Regulations, part 77, concerning:

Description:	"EAST ALTAMONT ENERGY CENTER" POWERPLANT FACILITY
	SOUTHEAST OF BYRON BETHANY & MOUNTAIN HOUSE ROADS
Location:	TRACY CA
Latitude:	37-48-14.22 NAD 83
Longitude:	121-34-27.88
Heights:	175 feet above ground level (AGL)
	209 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking and/or lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory Circular 70/7460-1K Change 1.

This determination expires on 12/28/02 unless:

(a) extended, revised or terminated by the issuing office or
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case the determination expires on the date prescribed by the FCC for completion of construction or on the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, frequency(ies) or use of greater power will void this determination. Any future construction or alteration,

including increase in heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

A copy of this determination will be forwarded to the Federal Communications Commission if the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at 310 725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 01-AWP-2169-OE.

Karen Mc Donald
Specialist, Airspace Branch

(DNE)